



## RESEARCH PAPER

# Influenza vaccination coverage and obstacles in healthcare workers (HCWs) and the follow up of side effects: a multicenter investigation in Iran

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## Keywords

Influenza • Vaccination • Healthcare workers

## Summary

**Introduction.** Seasonal influenza is an annual common occurrence in cold seasons; but the COVID-19 pandemic is also currently ongoing. These two diseases can't be distinguished from their symptoms alone; therefore, the importance of preventing influenza by vaccination is more than ever. Due to the high exposure of hospital personnel, widespread influenza vaccination of these high-risk groups seems to be a necessity. This Study conducted to determine vaccination coverage in the personnel of four tertiary referral collegiate hospitals in 2019 and to further investigate individual obstacles for Influenza vaccination.

**Methods.** In this cross-sectional descriptive study, 637 personnel were selected randomly from distinctive hospitals in a list-wised. Ones vaccinated filled the side effects questionnaire and who not vaccinated filled the vaccination obstacles questionnaire. The study was approved by the ethics committee of Tehran University

of Medical Sciences with this reference number: IR.TUMS.IKHC.REC.1398.218

**Results.** The mean vaccination coverage was 29.4% and the coverage difference among centers was not statistically significant ( $p = 0.192$ ). The following items had the most impact on personnel decision: confidence about one's immune system ( $p < 0.05$ ), the experience of side effects from previous vaccinations ( $p = 0.011$ ), attitude about vaccination in colleagues ( $p = 0.021$ ) and work experience ( $p < 0.05$ ). About 23% of vaccinated individuals reported side effects following vaccination and the most common side effect was mild cold symptoms with 12.3% prevalence.

**Conclusion.** The results of the current study revealed that influenza vaccination coverage among HCWs is not satisfactory in Iran. Hospital authorities and infection control units should plan to remove the obstacles of influenza vaccination.

## Introduction

Influenza, also known as “the flu” is an infectious disease caused by the influenza virus, leading to an acute respiratory illness affecting the upper and/or lower respiratory tract [1]. Receiving an influenza vaccination, as CDC confirms, is the major public health measure for the prevention of influenza virus infection [2] and thus, vaccination has to be considered one of the most crucial actions which have to be taken to immunize healthcare workers who are highly in exposure to various threatening viruses.

Influenza epidemics are a familiar annual event, but currently in the absence of widespread use of vaccine for novel coronavirus, the COVID-19 pandemics also circulate in parallel with seasonal influenza [3, 4]. WHO concerns many healthcare systems are already reached to their limits and may not be able to deal

with influenza. Unfortunately, the two diseases can't be distinguished from their symptoms alone, and laboratory tests are needed. Therefore, the importance of preventing influenza infection is certainly these years more than ever. The most effective way to avoid influenza infection is through vaccination [3].

Based on a rapid evidence appraisal identifying the public health need for healthcare worker (HCW) influenza immunization and the international independent expert group confirmed in 2019 the need to support policy-making for health worker vaccination to support pandemic preparedness in countries in line with the WHO global influenza vaccine strategy. However, some studies are indicating that the majority of healthcare workers are not usually immunized based on different reasons [5]. Some of the barriers to acceptance of influenza vaccination among HCWs are fear of vaccine side-effects (especially influenza-like symptoms), perceived ineffectiveness of

the vaccine, insufficient time, or inconvenience [6, 7]. Other factors included perceived low likelihood of contracting influenza, perceived low threat compared to other infectious diseases, avoidance of medications, and fear of needles [8]. In response to these perceptions, healthcare facilities have adopted programmatic strategies to improve vaccination uptake in HCWs including the participation of senior personnel or opinion leaders as role models, removing administrative barriers, e.g. costs, providing on-site vaccination delivery service at convenient times that are easily accessible by HCWs [5, 9]. Several studies have highlighted that the vaccinated and non-vaccinated HCWs had opposing perceptions about the risks and benefits of the vaccination and degree of its benefits [10, 11].

Despite the importance of identifying and breaking these barriers in increasing vaccination coverage of HCWs, there have been limited studies countrywide, investigating the vaccine coverage rate among HCWs and identifying barriers to get vaccinated among them [7, 12]. Therefore, in this study, we are trying and aiming to help the governors and motivate them to work things out to define a new priority for immunizing HCWs who are highly vulnerable for transmitting the disease. The other contribution of the current paper is to analyze adverse effects of vaccination and exploiting the scope of its effectiveness in HCWs.

## Methods

In this cross-sectional descriptive study, some personnel of distinctive hospitals (four tertiary referral collegiate hospitals in Tehran, Iran) were selected randomly in a list-wised fashion. Moreover, a pre-designed questionnaire was taken from listed HCWs regarding their attitude of vaccination and their confidence about their immune system capabilities, vaccination history, number of flu episodes in the past year as well as the scope and severity of symptoms if present, underlying diseases, fear from side effects and injection, side effects regarding vaccination, and their demographic data as well as their working experience.

Another questionnaire was additionally taken from vaccinated HCW regarding the side effects they have experienced following their current influenza vaccination.

## RESEARCH ETHICS

In this study no intervention was done, and no cost imposed on the participants. Researchers, in all stages, were adhered to the principles of the Helsinki manifesto and the Ethics Committee of Tehran University of Medical Sciences. Ethics Code: IR.TUMS.IKHC.REC.1398.218.

## Results

From 637 listed individuals as healthcare workers across four hospitals, 477 were female and 160 were

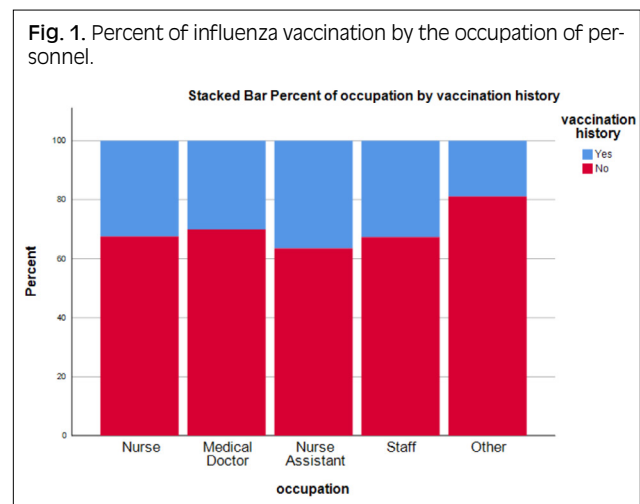
males. Vaccination coverage across all hospitals was 29.4% with the median age of 36.88 and 34.15 years in vaccinated and non-vaccinated groups respectively. The vaccination coverage was significantly different between sex groups with 35.85% and 27.31% for males and females respectively ( $p = 0.041$ ). Vaccination coverage in these four hospitals was 24.41, 27.51, 34.29, and 34.33%. Vaccination coverage among different centers was not statistically significant ( $p = 0.192$ ).

To analyze possible etiologies for not getting vaccinated, the chi-square test was used to compare questionnaire variables between vaccinated and non-vaccinated groups. The mean work experience was 11.83 and 8.92 years for vaccinated and non-vaccinated groups respectively which was statistically significant ( $p < 0.05$ ). Besides, 33.8% of individuals in the non-vaccinated group had high self-esteem about their immune system capability which was significantly higher from 12.2% in vaccinated individuals ( $p < 0.05$ ). Also, 75.4% of individuals who had a history of occurrence of side effects following their previous vaccination haven't participated in the new year's vaccination program, which was statistically significant ( $p = 0.011$ ). Moreover, 14.1% of non-vaccinated individuals were heard negative feedbacks and attitudes from their colleagues, which was significantly more from 7.5% in vaccinated individuals ( $p = 0.021$ ). Interestingly, known vaccination side effects that had been occurred in an individual's colleagues had no significant difference between vaccinated and non-vaccinated individuals ( $p = 0.682$ ).

Lack of education and knowledge about vaccination benefits had no significant difference between vaccinated and non-vaccinated individuals in our study. In addition, vaccination was not significantly different regarding individuals' occupation, which is shown in Figure 1.

Moreover, vaccinated proportions were not significantly different across different wards and units (Fig. 2).

The relative frequency of different side effects following influenza vaccination from 187 vaccinated



individuals is summarized in Figure 3. Common cold and influenza symptoms, as well as, fever were the most common side effects following the vaccination. To assess vaccination efficacy in healthcare workers, the occurrence of flu symptoms in last year were compared in vaccinated and non-vaccinated individuals. Twenty percent of vaccinated individuals experienced one or more episodes of flu-like symptoms in the past year which wasn't significantly different from 15.38% in non-vaccinated individuals; Although, vaccinated individuals had a significantly faster recovery following the onset of the symptoms ( $p < 0.05$ ). This study about the duration of flu symptoms in vaccinated and non-vaccinated individuals suggested 69.76% of vaccinated individuals had a recovery duration of 3 days or less from their symptom onset, which is significantly more from 50% in the non-vaccinated group.

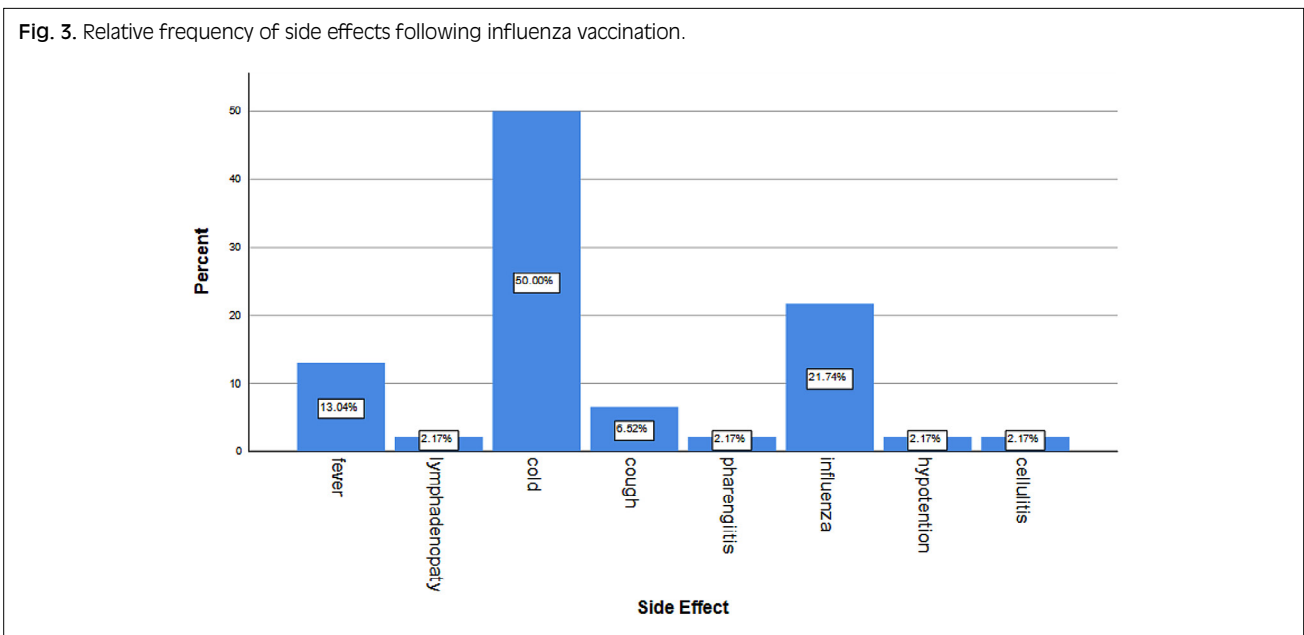
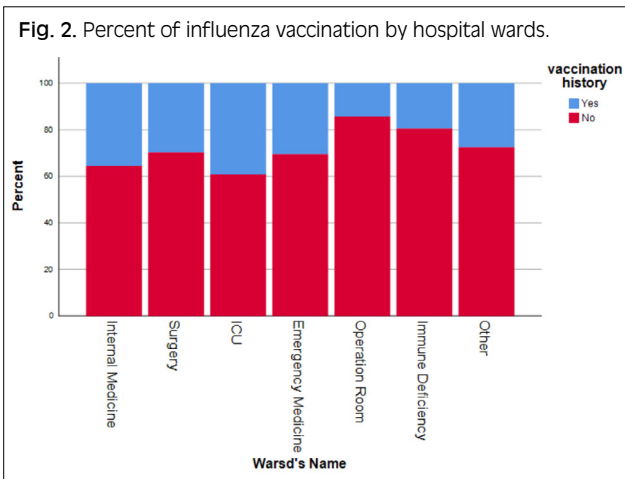
### Discussion

Results of the current study revealed influenza vaccination coverage among healthcare centers in Iran is not satisfactory. Moreover, in this study individuals' attitude about the probability of "getting the disease" was correlated with their willingness for vaccination. Interestingly results of the current study suggest this probability is more correlated with one's self-esteem about his/her immune system capability as well as, his/her personal history of getting the flu rather than educational and knowledge of severity and prevalence of the illness. This effect of attitude in vaccination was previously shown in several studies [5, 6, 13]. Interestingly, more working experience had a positive impact on getting the influenza vaccine. This is coherent with several studies that showed more professional experience correlation with higher vaccination rates [14-16]. Although, in contrast to the study performed by Barbodoro which stated good awareness of influenza and influenza vaccination is positively correlated with more vaccination rates [14], here such a correlation was not present.

Findings of the present study suggested although influenza vaccination can have limited to no effects in the prevention of the flue, it significantly accelerates the recovery process and reduces the severity and shortens the course of the illness. These findings are in line with the study by Nishi et al. [17] except in our study vaccination didn't decrease yearly flu episodes in HCWs.

The results from the current study suggested a relatively low prevalence of mostly mild side effects following the influenza vaccination. Hashemi et al. has reported similar results in a study performed in Shiraz [7].

Current years however are quite unique because the



symptoms of patients may not necessarily be due to influenza but also due to the COVID-19. In addition, because of standing the receptors for both influenza and COVID-19 on human host cells one may get infected with either or both infection. Hence the scientists encourage everyone to take the vaccine and avoid this complex scenario [4]. Besides, in a conclusion by Debisarun et al, influenza vaccine can also induce trained immunity responses and may also create a relative protection against COVID-19. These data, coupled with similar reports, discuss a beneficial effect of influenza vaccination in the influenza season against both infections [18, 19].

## Conclusions

Considering international recommendations on influenza vaccination for HCWs, the results of the current study revealed that influenza vaccination coverage among HCWs is not satisfactory in Iran. Hospital authorities and infection control units should plan to remove the factors correlated with not getting vaccinated in healthcare workers. Influenza vaccination is an effective way to prevent or reduce the severity of seasonal flu in healthcare workers with few and mostly mild side effects.

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## Conflict of interest statement

The authors declare no conflict of interest.

## Authors' contributions

HM: senior supervisor of the study; HNG: primary analysis and preparation of manuscript draft; MM, RP, HM, GA, AA and VYB: data collecting in Sina hospital, Shariati hospital, Amir Alam hospital, Imam Khomeini hospital, Cancer Institute and Valiasr hospital respectively; ASH, ME, HA and A-AA: study supervision and confirming the data in Shariati hospital, Imam Khomeini hospital Complex, Sina hospital and Amir Alam hospital respectively; SA: designing the study, final analysis and revising the paper. MH and NGH contributed equally to this work. All authors reviewed the results and approved the final version of the manuscript.

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