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Review

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ABSTRACT We assessed whether an influenza vaccination (IV) campaign was effective at increasing vaccination rate in healthcare workers (HCWs) in 2 hospitals in Doha, Qatar that had no mandatory IV policy. The campaign comprised promotional, educational and vaccine delivery interventions; a dedicated IV team; telephone hotline; free IV with improved access, leadership involvement; incentives; group educational sessions; and reporting/tracking activities. During the 2014/15 influenza season, IV rates according to hospital and HCW category were calculated and compared with the 2 seasons before the intervention. The combined mean rate for IV for

both hospitals increased for 2014/15 (64.3%) compared with 2013/14 (37.2%) and 2012/13 (28.4%). There was increased IV uptake among doctors and nurses at each hospital, and the IV rate for the 2 hospitals (59.1 and 69.5%) were higher than in 2013/14 (21.1% and 53.2%) and 2012/13 (17.2% and 39.6%). The findings highlight the importance of improving IV rates among HCWs in hospitals with no mandatory vaccination policies through multicomponent interventions.

Amélioration des taux de vaccination antigrippale parmi les agents de santé : une approche à plusieurs volets au Qatar

RÉSUMÉ Nous avons cherché à déterminer si la réalisation d'une campagne de vaccination antigrippale influait sur l'augmentation du taux de vaccination chez les agents de santé de deux hôpitaux de Doha (Qatar), qui ne disposaient pas de politiques de vaccination antigrippale obligatoire. La campagne comprenait les éléments suivants : des prestations de promotion et d'éducation, et des interventions concernant les services de vaccination ; des équipes de vaccination antigrippale dédiées ; une ligne téléphonique spéciale ; la vaccination antigrippale gratuite avec un accès amélioré ; l'implication de la direction ; des mesures incitatives ; des sessions de groupe éducatives ; et des activités de notification/de suivi. Pendant la saison grippale 2014-2015, les taux de vaccination antigrippale pour les hôpitaux et pour chaque catégorie d'agents de santé ont été calculés et comparés avec les deux saisons précédant l'intervention. Le taux moyen combiné pour la vaccination antigrippale pour les deux hôpitaux avait augmenté sur la période 2014-2015 (64,3 %) par rapport aux périodes 2013-2014 (37,2 %) et 2012-2013 (28,4 %). Le recours à la vaccination était en augmentation parmi les médecins et les personnels infirmiers dans chaque hôpital, et le taux de vaccination antigrippale pour les deux hôpitaux (59,1 % et 69,5 %) était plus élevé qu'en 2013-2014 (21,1 % et 53,2 %) et qu'en 2012-2013 (17,2 % et 39,6 %). Les résultats soulignent l'importance d'améliorer, au moyen d'interventions à multiples composantes, les taux de vaccination antigrippale parmi les agents de santé dans les hôpitaux où il n'existe pas de politiques de vaccination obligatoire.

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Introduction

Seasonal influenza is a major threat to public health and causes up to 1 million deaths annually. Evidence supports the vaccination of priority groups, including healthcare workers (HCWs) (1). Annual influenza vaccination (IV) is an important preventive strategy among HCWs, who can acquire influenza from and transmit it to patients and other HCWs (2). A recent systematic review reports that IV of HCWs can enhance patient safety and protection (3,4). In addition,

vaccination of HCWs can decrease absenteeism and convey economic benefits to healthcare establishments (1,5). Thus, seasonal IV is recommended for HCWs, but despite its benefits, coverage has often been low, rendering hospitals and clinics vulnerable to outbreaks (6).

In Qatar there is no mandatory policy for IV of HCWs. Hence, vaccination rates have usually been low, despite well-established benefits and strong recommendations for IV of all HCWs. The current study aimed to determine whether an IV campaign comprising several parallel interventions implemented at multiple levels was effective in increasing IV of HCWs in 2 major hospitals in Doha, Qatar.

Methods

IV campaign

The IV campaign for the 2014/2015 influenza season was implemented from 21 September to 30 October 2014, followed by extension from 15 November to 1 December 2014. Table 1 depicts the composition and main roles of the IV campaign team. The campaign comprised parallel interventions that were implemented at multiple levels as follows.

Vaccination team comprising infectious diseases physicians, epidemiologists, administrators, pharmacists and nurses.

A 24/7 telephone hotline was available during the campaign.

Free of charge vaccination.

Leadership involvement. (1) Senior hospital management disseminated regular statements and consistent announcements in support of seasonal IV to all HCWs. (2) Photographs and posters of senior staff while receiving the vaccine were disseminated and erected in the hospital.

Improved access to vaccination. (1) Provision of IV services at multiple locations throughout the hospitals [4 at Hamad General Hospital (HGH) and 1 at National Center for Cancer Care and Research (NCCCR)] and at times that were easily accessible by HCWs (08:00–14:00). (2) Mobile IV units were provided to facilitate vaccination of HCWs in various departments, clinics

and operating theatres. Each mobile team comprised a nurse who undertook vaccination and another that simultaneously collected the HCWs' details. (3) The IV period was extended as described above, and extra nurses were recruited to assist in the campaign and in vaccine administration.

Incentives: promotional resources and educational materials were provided in the form of newsletters, badges, pens, magnets, key chains, brochures and mugs.

Group educational sessions before and during the campaign including: lectures, posters, communication fora, announcements, newspaper articles and e-mail communications (7) highlighting the benefits of IV, as well as potential health consequences of influenza.

Reporting activities: (1) tracking IV rates on a weekly basis to initiate friendly competition between departments and hospitals; (2) weekly compliance reports to managers; and (3) mandatory declination form to be completed by any HCW who declined voluntary IV.

HCWs who refused vaccination were requested to sign a declination form. While signing this form was mandatory for HCWs working in specific high-risk areas (e.g., operating theatres, burns units, and medical, surgical, paediatric and neonatal intensive care units), it was voluntary for other HCWs who refused IV. All HCWs who refused IV (regardless of whether they signed the declination form) were assured that the declination form was solely for statistical purposes and there would not be any repercussions for refusing IV.

Study ethics

The current study was approved by Hamad Medical Corporation (HMC), Doha, Qatar (Research Project #11167). This paper reports the findings of HCW IV in 2 major hospitals in Doha: HGH (600-bed capacity) and NCCCR (60-bed capacity), which are both in the Tertiary Hospitals Group in Qatar.

Data analysis

The HCW and the vaccinating nurse signed a form after vaccination. The HCW data collected included date and time of vaccine administration, name, age, sex, speciality and ID number. Trained data entry clerks transferred the data from the paper forms to a computer. Frequent spot checks were undertaken to ensure that data entry was error free. The paper forms were

kept in a secure locked metal cabinet in the office of the IV coordinator (first author), which was only accessible to the IV team. The data about IV uptake in both hospitals were collected between September and December 2014 and collated. We gathered IV status data (numerators) from the IV teams who vaccinated the HCWs (extracted from the vaccination registries of the Infection Control Department). The total numbers of HCWs (denominators) were derived from the Human Resources Department at each hospital. The numerators and denominators were used to calculate IV rates, which were compared with those of the 2013/14 and 2012/13 seasons, using the $\chi 2$ test (significance level set at P

Results

Table 2 shows the IV uptake at 2 major hospitals in Qatar over 3 consecutive years according to HCW category. There was a significant increase in IV uptake in the intervention year (2014/15 season). This increase was observed among physicians, nurses and other HCWs at both hospitals. However, at HGH, while there was an encouraging increase in IV rates for physicians and nurses, the rate (≤ 50%) could still be improved. In contrast, at NCCCR, the IV uptake increase was more apparent, reaching 100% for physicians and 73.6% for nurses. Two particularly interesting observations can be made from Table 2. Other HCWs appeared to have high IV uptake compared to nurses and physicians. Compared to 2012/13, IV uptake was also increased in 2013/14 before the current intervention was implemented.

We received 142 declination forms. The reasons stated for IV refusal included: “I am pregnant” (n = 12); “I do not like it (influenza vaccine)” (n = 46), “causes allergic reaction” (n = 6); “I am receiving chemotherapy” (n= 1); “I do not believe the vaccine benefits (n = 32); “the vaccine weakens me more” (n = 2); “I do not get influenza” (n = 4); “I have asthma” (n = 5); or did not state any reasons (n = 4).

We examined the sick leaves certificates issued by the HMC Staff Clinic due to influenza as an indirect indicator of the effectiveness of our IV campaign. In 2014 there were 370 certificates compared with 320 in 2015 (intervention year).

Discussion

In both hospitals in our study, there was a significant increase in IV rates for the 3 categories of HCWs in the intervention year compared with the previous years.

IV coverage among HCWs is a healthcare quality indicator (8), and reports confirm the importance of improving IV rates through multicomponent interventions (3). IV prevents influenza-related illness and work absence among HCWs (9,10), and is associated with reduced

influenza-related illness (11,12) and death (13,14) among their patients.

While all recommended vaccinations for HCWs are important, IV is particularly important, given that HCWs are at risk of occupationally acquired influenza, which can be asymptomatic, rendering them a reservoir for vulnerable patients (15). A European vaccination policies review for HCWs reported significant national differences as regards the recommended vaccines, implementation (mandatory/recommendation), target HCW groups and healthcare settings (16). Nonmandatory strategies remain a topic of ongoing research and controversy, and optimal approaches to increase vaccination coverage and make HCWs an efficient barrier against infectious diseases are under debate (6). Against such a background, the current study, for the first time in Qatar, implemented a multicomponent IV campaign, and investigated whether such an approach was effective in increasing IV rates in HCWs in 2 major hospitals in Doha.

The increased IV rates after our multipronged campaign agree with the literature. A recent systematic review and meta-regression analysis (17) reported that “soft” mandates (such as those we used) could be effective. Such soft mandates included declination statements, increased awareness and increased access. We also simultaneously used incentives and education to increase IV, however, Lytras et al. (17) found that incentives did not make a significant impact and education had no effect on IV.

Our intervention included improved access to IV, which was provided at multiple locations and at times that were accessible to HCWs. In addition, we extended the vaccination period, recruited extra nurses to assist in the campaign, and held multiple educational sessions to clarify the benefits of IV and dispel common misconceptions about adverse effects. Such activities support research in the United States of America (USA) (18), where the determinants of IV compliance among HCWs included occupational health encouragement, perceived importance of vaccination, on-site access, and no fear of adverse effects. Our findings agree with other studies, in which, among HCWs without an employer’s obligation for vaccination, coverage was higher for HCWs in settings where vaccination was offered on-site at no cost for 1 (73.6%) or several (83.9%) days, and lowest among HCWs in settings where vaccination was not required, promoted or offered on site (44.0%) (19).

The publicity approaches that we utilized in the IV campaign embraced leadership involvement, with regular dissemination of statements and consistent announcements, as well as pictures and posters of senior staff being vaccinated. Such activities are in line with IV uptake among HCWs at a Malaysian teaching hospital, where workplace publicity was the main source of information about the vaccine (2). Our 2014/15 vaccination season was the first year to implement the declination form, which could have contributed to the increase in IV coverage, as

previously witnessed in the USA (20).

Although the IV rates improved for the intervention year (2014/15 season) compared with the previous 2 seasons, this increase was not uniform across the 2 hospitals. This might have been due to the difference in hospital size, with HGH being the largest in Qatar. In the USA, vaccine acceptance varies by location, and vaccination rates in the previous year are an important facility-level predictor of vaccine acceptance (21). It is essential to consider the number of employees in smaller hospitals that could be conducive to implementation of an IV campaign. Future research should aim to understand how workplace context influences vaccine acceptance.

After 3 decades of official recommendations that all HCWs should be vaccinated against influenza, IV rates remain at

The Virginia Mason Medical Centre in Seattle, Washington, was one of the first organizations to implement such a policy in 2005, and many organizations and states in the USA have followed suit (23). BJC HealthCare in St Louis, Missouri, recently implemented a mandatory IV policy and achieved a 98.4% vaccination rate in the first year after implementation (23). Our findings also agree with those in Japan, where >90% coverage has been achieved despite a nonmandatory policy (24).

Across our 2 hospitals, while there was an encouraging increase in IV rates for both physicians and nurses, the former exhibited a higher rate of IV uptake. We found in all 3 seasons that other HCWs appeared to have higher IV uptake compared to nurses and physicians. Although we included HCWs, many previous studies limited their analyses to physicians and nurses and ignored other HCWs (25). Speculation about why HCWs appeared to have high IV uptake compared to nurses and physicians is not straightforward and needs to consider a wide range of demographic, educational, occupational, socioeconomic and health confounders, as well as residual confounding due to IV knowledge, attitudes and practice. Such confounders include age, sex, marital status, education level, specialization, years of service, chronic comorbidity (e.g., those with diabetes or cardiovascular diseases were more likely to be vaccinated against seasonal influenza (25)), as well as personal beliefs about vaccine safety and efficacy. Indeed, research has highlighted a prevalent individual approach to vaccination among HCWs, as well as ethical issues concerning physicians who seem not to be concerned about the impact of influenza on themselves or their patients (25).

In a recent study in Italy, 12.5% of HCWs showed annual “loyalty” to IV (26). Similarly, the other HCWs in our study exhibited more loyalty to IV than physicians and nurses did. Another suggestion is that the other HCWs had a greater sense of ethical duty to receive IV annually compared to physicians and nurses. A third proposition might be the belief that pharmaceutical companies influence decisions about vaccination strategy, which could reduce the odds of receiving IV (27). We were unable to exclude whether other HCWs held such beliefs more than the physicians and nurses. Finally, although there are no data on so-called vaccine hesitancy among HCWs, the European Centre for Disease Prevention and Control has reported that the key determinants among European HCWs are concerns about vaccine safety (particularly for influenza), and mistrust of pharmaceutical companies, governments, health authorities and research (28). Future research should investigate the notions of loyalty, ethical duty, vaccine hesitancy and personal beliefs that pharmaceutical companies influence decisions about vaccination strategy, to assess the effects of such notions on IV uptake among different categories of HCWs.

We also observed that compared to 2012/13, IV uptake increased in 2013/14 before the current intervention was implemented. Again, it is difficult to establish the reasons for this. Qatar had been increasingly emphasizing the importance of IV among HCWs even before the formal campaign was initiated in 2014/15. Health campaigns do not arise spontaneously without a reason, and there is usually some background low-grade advocacy preceding any formal campaign. Such activities could have contributed to the observed increase in IV rates before formal initiation of our campaign.

The World Health Organization (WHO) has recommended since 2002 that HCWs should be vaccinated against influenza (29). Routine annual IV for all persons aged ≥6 months who do not have contraindications has been recommended since 2010 by the US Centers for Disease Control and Prevention (CDC) and CDC Advisory Committee on Immunization Practice (30). Annual vaccination is the primary means of preventing influenza and its complications. Influenza vaccine is recommended annually from age 6 months during the influenza season, especially for high-risk persons, including those aged >65 years and those with chronic health conditions such as asthma, diabetes, lung disease, heart disease, immunosuppressive disorders, and organ transplant recipients (31).

Qatar National Immunization Committee and Ministry of Public Health recommend IV annually from age 6 months during the influenza season, especially for high-risk persons and pregnant women. HMC the largest healthcare provider in Qatar and annually organizes the IV campaign.

Although evidence shows that vaccination is the most effective measure available to prevent

influenza and its complications, and HCWs play a pivotal role, there are still misconceptions about influenza vaccination and its risks. We observed such misconceptions in the declination forms from HCWs, which included pregnancy, allergic reaction to vaccine, undergoing chemotherapy, weakness induced by vaccine, and asthma.

Pregnant women have protective levels of influenza antibodies after vaccination, and passive transfer of antibodies from vaccinated women might provide protection to neonates (32). Pregnant women should be vaccinated against influenza at any stage of pregnancy (33).

The American Lung Association Airways Clinical Research Centers found that IV was safe in a large, diverse group of adults and children with asthma, and encourage the promotion of programmes that emphasize the importance of this vaccine in patients with asthma (34).

IV is safe and most people only have redness, soreness or swelling where the vaccine is administered. Some individuals, especially those receiving the vaccine for the first time, may have a headache, muscle aches or tiredness. Guillain–Barré syndrome (GBS) is a rare condition that can result in muscle weakness and paralysis. It most commonly occurs after infection, but in rare cases can also occur after vaccination. GBS may be associated with influenza vaccine in about 1 per million recipients. Individuals who have egg allergy may be at increased risk of reaction to some influenza vaccines (34).

There are links between levels of knowledge and vaccination uptake rates (35). Although attention was given to IV recommendations and policy during 2010–2015, there is still a need for education among HCWs to ensure that they have sufficient knowledge about the facts of IV.

As an indirect indicator of the effectiveness of our IV campaign, we examined sick leaves certificates issued by the HMC Staff Clinic due to influenza. In 2014 there were 370 certificates due to seasonal influenza, compared with 320 in 2015 (intervention year). Although these results show a decrease in sick leave certificates due to seasonal influenza, they need to be treated with caution because HCWs can also receive certificates from other departments than the Staff Clinic, for example, the Outpatient Department. In addition, these certificates should not be taken as a proxy for influenza because these were not laboratory-confirmed cases.

This study had some limitations. We did not gather data from all the hospitals in Qatar, although

the 2 selected for the study are the largest. It would have been beneficial to identify the effectiveness of particular components of our intervention that might have positively influenced IV uptake by HCWs, and relate such components to the demographic, educational and occupational characteristics of the HCWs and the characteristics of the hospital. It would have been useful to have data on the numbers of HCWs who received IV from routine services versus those who received IV through other strategies designed for the campaign, to be able to contrast these sources of IV.

Conclusions

An integrated multimodal approach incorporating education, leadership involvement, improved access, incentives, and reporting and tracking components was associated with increased IV in HCWs. Our findings have important public health policy implications. First, such approaches may provide a model for behavioural change within healthcare organizations with no mandatory vaccination polices. Second, our findings highlight the importance of improving IV rates among HCWs through multicomponent interventions. Third, implementing wide-ranging vaccination strategies that include multipronged approaches in which the vaccine is available at no cost at the workplace, along with active promotion and feedback, might boost IV coverage among HCWs and reduce the risk of influenza to HCWs themselves and their patients, families and the general public. Finally, public health policy has now been established by which multicomponent interventions for IV of HCWs will be implemented yearly at all hospitals in Qatar.

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