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# Influenza vaccine uptake, determinants, motivators, and barriers of the vaccine receipt among healthcare workers in a tertiary care hospital in Saudi Arabia

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## SUMMARY

**Background:** Influenza vaccination of healthcare workers (HCWs) is essential for patient safety, their own safety, and hospital operation. However, despite its strong recommendation, studies indicate a low rate of vaccine uptake.

**Aim:** To assess rates of, and factors affecting, influenza vaccine uptake among HCWs.

**Methods:** A cross-sectional survey was carried out during October 1<sup>st</sup> to 16<sup>th</sup>, 2015, among HCWs in King Abdullah Medical City in Makkah, Saudi Arabia. A self-administered, anonymous questionnaire was distributed to HCWs; this included questions on demographic characteristics, vaccine uptake, and knowledge, beliefs, attitude, and concern about influenza vaccine.

**Findings:** Out of 500 HCWs approached, 447 returned valid self-reported questionnaires with response rate 89.4%. Overall, 88.3% of the participants reported receiving vaccination during the 2014/15 season, higher than during the 2013/14 (61.2%) and 2012/13 (54.5%) seasons. Self-protection (81.5%) was the main reason for vaccination, whereas 73.4% of HCWs reported vaccination to protect patients. The main reasons for vaccination avoidance were misconception that the vaccine causes influenza (38.5%) and concern about vaccine efficacy (32.7%). Logistic regression analysis revealed that the following were independently associated with vaccine receipt among HCWs: awareness of vaccine guidelines; intention to receive the vaccine next season; nurses and other HCWs compared to physicians; longer practice; and age >40 years.

**Conclusion:** A good uptake of influenza vaccine was achieved during the 2014/15 season following adoption of mandatory vaccination policy. Awareness programmes are needed to correct HCWs' misconceptions about the vaccine. Efforts need to focus especially on physicians, younger staff and new recruits.

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## Introduction

Seasonal influenza is an acute viral infection caused by influenza viruses; infected individuals are highly contagious and can transmit influenza for 24 h before they are symptomatic.<sup>1</sup> Influenza causes significant morbidity and mortality;

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indeed, on a worldwide basis, influenza as a contributor or cause of death outpaces all the other vaccine-preventable diseases combined. Hospitalized patients are frequently more vulnerable to influenza than members of the general population.<sup>2,3</sup>

Healthcare workers (HCWs) can be central to influenza transmission in hospitals as they are exposed to both infected patients and patients in high-risk groups.<sup>1</sup> Influenza outbreaks in hospitals cause morbidity among patients and HCWs; they also interfere with normal function of healthcare systems, for example by impacting on HCW numbers and workload and on hospital income as a result of fewer elective admissions and operations.<sup>4</sup>

In Saudi Arabia, our hospital in Makkah experienced an influenza outbreak in January 2016, with 12 confirmed cases of whom eight were among HCWs.<sup>5</sup> An outbreak of influenza A (H1N1) in a long-term care facility at Taief in 2010 affected 21 residents (an attack rate of 47.7%), with two deaths.<sup>6</sup> In Riyadh, two outbreaks occurred at a tertiary hospital in early August and late October 2009 with 526 HCWs confirmed H1N1 influenza positive.<sup>7</sup> Large outbreaks have also been reported in other countries. For example, an influenza outbreak in a Japanese general hospital in December 2014 affected more than 100 individuals (41 patients and 62 staff), with two deaths among elderly patients.<sup>8</sup>

Seasonal influenza vaccination of HCWs is a core component of infection control policy and patient safety programmes.<sup>9,10</sup> Such programmes can reduce patient morbidity and mortality, increase patient safety, and reduce work absenteeism among healthcare workers.<sup>11–13</sup>

Vaccination coverage among HCWs varies substantially between different studies and countries, with lower rates of uptake mostly reported. In a cross-sectional survey in 27 European countries vaccination coverage in HCWs ranged between 13% and 89%, with uptake rates in different centres frequently being <35%, sometimes <25%.<sup>13</sup> In the USA, the Centers for Disease Control and Prevention influenza season report from 2014/15 showed that 77.3% of all HCWs reported having had an influenza vaccination, an increase of 13.8% compared with the 2010/11 season estimate. This improvement in vaccine coverage was attributed mainly to more hospitals adopting mandatory vaccination policies.<sup>14</sup>

Influenza vaccine uptake rates among HCWs in Saudi Arabia have previously been reported to be low. In 2014 Alshammari *et al.* reported 38% coverage in six major hospitals, and in 2010 Rehmani and Memon reported 34.4% coverage; both of these are substantially better than the 5.9% coverage reported among HCWs employed in Hajj healthcare facilities in 2007.<sup>15–17</sup> In neighbouring countries, uptake of influenza vaccine among HCWs has also been reported to be low: 24.7% in the Emirates, 46.4% in Oman, 67.2% in Kuwait, and 19.4% in Qatar.<sup>18,19</sup>

HCWs and healthcare systems have an ethical and moral duty to protect vulnerable patients from influenza.<sup>20</sup> Owing to the failure of voluntary immunization programmes for HCWs, mandatory polices are being increasingly adopted by healthcare institutions and public health authorities.<sup>9</sup>

In Saudi Arabia, healthcare institutions dealing with pilgrims during Hajj seasons provide emergency care for a high-risk group of patients, who are predominantly elderly with comorbid conditions.<sup>20</sup> Being exposed to stressful physical conditions puts them at risk of complicated and/or serious

influenza.<sup>21,22</sup> In response, the Saudi Ministry of Health has mandated influenza vaccination for all HCWs in settings providing healthcare for pilgrims.

Few previously published studies were identified exploring influenza vaccination among HCWs in healthcare facilities serving Hajj pilgrims.<sup>17</sup> Moreover, there is a need to assess the impact of the recent mandatory vaccination policy. The aims of this work were to assess the uptake rates of seasonal influenza vaccine among HCWs, and to identify determinants of compliance with the vaccine uptake and reasons that inhibit or motivate vaccination.

## Methods

### Study design and setting

The study was a cross-sectional survey carried out between October 1<sup>st</sup> and 16<sup>th</sup>, 2015 among HCWs in King Abdulla Medical City, which is a tertiary care, 550-bed hospital, located in holy Makkah, Saudi Arabia. The hospital has more than 3150 staff, including 574 physicians, more than 900 nurses, and 720 other HCWs directly involved in patient care. The hospital admitted 11,329 inpatients and received 155,204 outpatient visits during 2014. Like other hospitals in Saudi Arabia, the hospital provides influenza vaccine free of charge to all HCWs.

### Subjects

The eligible participants were HCWs who are engaged in direct patient care, including physicians, nurses and other healthcare workers (pharmacists, laboratory personnel, therapists, technicians, and other staff directly involved in patient care).

### Sample

The investigators received a complete list of the eligible HCWs. A representative stratified random sample was taken from the eligible population. Sample size was determined before study initiation and calculated conservatively to allow for maximum sample size, assuming a 50% influenza vaccination uptake among the respondents with a margin of error of 5% at 95% confidence level. Consequently, a sample of 327 HCWs was sought. Anticipating 60–70% response rate, 500 questionnaires were distributed taking into consideration a balanced proportion of HCWs according to assignment, departmental affiliations, and work shifts.

### Survey instrument and administration

An anonymous structured questionnaire was constructed based on a review of the literature and previous research findings.<sup>1,9,16,23,24</sup> The questionnaire included demographic, professional, and work practice characteristics of the respondents; uptake of seasonal influenza vaccine during 2014/15, 2013/14, and 2012/13 seasons; vaccine availability, provision of instructions and guidelines; beliefs, attitudes, and concerns about influenza vaccine. Included in the last section, questions sought to assess respondents' knowledge about influenza disease, vaccine facts, and uptake recommendations. The instrument was reliable for internal consistency with

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