Vaccine 30 (2012) 4813–4819

Contents lists available at SciVerse ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Nurses' vaccination against pandemic H1N1 influenza and their knowledge and other factors

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ARTICLE INFO

Article history:
Received 13 December 2011
Received in revised form 4 May 2012
Accepted 9 May 2012
Available online 27 May 2012

Keywords:
Pandemic H1N1
Vaccination
Nurses
Knowledge
Risk perception

ABSTRACT

This study aimed to estimate the vaccination coverage against the pandemic H1N1 influenza in a group of nurses and determine the factors associated with their vaccination behaviours. An anonymous, self-administered questionnaire was distributed to a convenience sample of nurses who were enrolled on continuing professional education courses in a university in London. The survey response rate was 77.7% ($n = 522$). A total of 172 (35.2%) nurses reported receiving the pandemic H1N1 vaccine in the 2009–2010 influenza season and only 22.3% of them had the intent to accept the vaccine in the next season. Compared to nurses with low knowledge scores, those with high knowledge scores were more likely to receive the pandemic H1N1 vaccine ($p = 0.017$), recommend the vaccine to their patients ($p = 0.003$), and have the willingness to recommend vaccination to patients in the future ($p = 0.009$). There was a higher vaccination rate among nurses with higher risk perception scores than with lower scores ($p = 0.001$). A small, positive correlation between H1N1 knowledge and risk perception scores was identified ($p < 0.001$) indicating that a high knowledge level was associated with high levels of risk perception. More male nurses received the H1N1 vaccine than females ($p < 0.001$) and there were a significant differences in the uptake among nurses from different clinical specialty groups ($p < 0.001$). About half of the vaccinated nurses reported the intent to be vaccinated again but only 8.1% of the unvaccinated nurses had the intent to receive the vaccine in the next season ($p < 0.001$). The pandemic H1N1 2009 influenza vaccination coverage among this nurse sample was sub-optional. Lack of knowledge and risk perception were predictors associated with the nurses' vaccination behaviours. The identified knowledge items should be addressed in future vaccination campaigns. The hindrances associated with continuing vaccination decision-making and factors contributing to the different vaccination coverage among clinical specialty groups require further exploration.

1. Introduction

In April 2009, a novel influenza A/H1N1 virus was first identified followed by the outbreak observed in Mexico [1]. The World Health Organization (WHO) [2] termed it as Pandemic H1N1 in June. By the end of January 2010, more than 209 countries or communities had reported pandemic influenza A/H1N1 cases with at least 15,174 deaths [3]. The first line of defence against pandemic H1N1 is vaccination which has proved both effective and safe [4–10]. WHO and other health organizations recommend five priority groups should be given the pandemic H1N1 vaccination including healthcare workers (HCWs) who have direct contact with patients [11,12]. Studies evaluating the acceptability and uptake of the pandemic (H1N1) influenza vaccine among HCWs have found a wide range of vaccination rates ranging from 13 to 37% in surveys conducted in Qatar [13], Turkey [14,15], Morocco [16], Germany [17], Spanish [18], French [19] and the United States [20]. However, the intention to receive the pandemic vaccine yielded higher rates with 36% in Italy [21], 44–53% in Australia [22], 62% in France [23], 83% in the Netherlands [24], and 69% in Canada [25] excluding extreme examples, with the lowest rate of vaccination intention at 17% in Greece [26] and the highest rate at 80% in Mexico [27].

The patient with H1N1 influenza can infect others from day 1 before the appearance of symptoms at days 5–7 [28] which puts HCWs at great risk of being infected and then transmitting it to others, such as their patients or families. It is therefore crucial to achieve a high vaccination coverage among HCWs, especially among nurses because of their close contact with patients. While there are some data on factors affecting the acceptance of the pandemic H1N1 vaccine among HCWs [13,18,19,21–23,26,27], those

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http://dx.doi.org/10.1016/j.vaccine.2012.05.012

focusing on nurses are scarce with only one survey conducted in Hong Kong indicating a very low acceptance of the pandemic H1N1 vaccination among nurses [29].

In the UK, after the first case was confirmed in April 2009, the virus spread rapidly with two waves of pandemic activity. The first wave peaked at 110,000 in mid/late July and second peaked at 84,000 in mid-October, causing at least 214 deaths by mid-November [30]. The first pandemic vaccine was delivered on 21 October 2009 [30] and the frontline staff were urged to have the pandemic H1N1 vaccination. However, many nurses were reluctant to be vaccinated. The Department of Health figures showed that only 40% of the National Health Services (NHS) frontline staff received the pandemic H1N1 vaccine [31]. To our knowledge, there has been no study addressing nurses' vaccination behaviours against the pandemic H1N1 in the UK. Thus, we conducted this study to estimate the vaccination coverage against the pandemic influenza in a group of nurses and analyse the factors associated with their vaccination behaviours.

2. Methods

2.1. Study design and setting

We conducted a cross-sectional survey at a large university in London which draws its students from across health care organizations in the city and south east England between May and mid-October 2010. A convenience sample of nurses who were enrolled on continuing professional education courses in the university was provided the information about the study and invited to participate in the survey. Anonymous questionnaires were distributed to those who volunteered to participate and completed questionnaires were collected immediately by the investigator or returned in the mail using freepost addressed envelopes to the research team. Follow-up of non-response was not possible because of the anonymous completion of questionnaires. Ethical approval was obtained from the University Ethics Committee.

2.2. Questionnaire

Data were collected by a self-administered, anonymous questionnaire developed by the researchers. The questionnaire was designed drawing upon published literature and comprised 6 sections regarding knowledge and risk perception towards the seasonal influenza and the pandemic H1N1 influenza, health beliefs (assessed by the Multidimensional Health Locus of Control (MHLC) scales [32]), vaccination behaviours against both the seasonal and the pandemic H1N1 influenza, reasons for accepting or refusing seasonal influenza vaccination (collected by two open-questions), and demographic characteristics. Eight items were used to assess the knowledge level towards the H1N1 and vaccination with response options of "yes", "no", or "unsure" and to provide the knowledge scores of between 0 (no correct response) and 8 (all correct responses). Risk perception towards the H1N1 was assessed using the four items Likert 4-points scale and providing scores of between 4 (the lowest risk perception) and 16 (the highest risk perception). The risk perception items included R1 (If I do not get H1N1 vaccination this year, I think I am very likely to get this influenza this year), R2 (Influenza A (H1N1) can cause death), R3 (If I had H1N1, I would have a severe illness), and R4 (If I had H1N1 I might die). Higher or lower risk perception groups were built using the score of 8. The details of the questionnaire and study findings relating to nurses' seasonal influenza vaccination have been reported elsewhere [33]. This paper will focus on the findings relating to nurses' vaccination against the pandemic H1N1 influenza.

2.3. Statistical analysis

There were four primary outcomes: (1) whether nurses had been vaccinated against the pandemic H1N1 influenza in 2009–2010; (2) whether they had intentions to be vaccinated in 2010–2011; (3) whether they had recommended the H1N1 vaccination to their patients in 2009–2010; and (4) whether they would recommend the H1N1 vaccination to their patients in 2010–2011. Statistical analysis was performed using a two-sided hypothesis. Pearson chi-square test or Fisher exact test was used to explore the statistical difference of categorical variables. The independent-samples *t*-test or the one-way between-groups analysis of variance (ANOVA) was used to compare statistical difference of continuous variables. Binary logistic regressions (for dichotomous variables) or ordinal logistic regressions (for ordered variables) were used to calculate the potential differences in the way those significant characteristics obtained from above analyses affected the probability of vaccination or the probability of vaccination recommendation. A *p*-value of less than 0.05 was considered as denoting statistical significance. Data were analysed using SPSS PASW Statistics 18.0.

3. Results

3.1. Response rate and H1N1 vaccination rate

Out of 936 qualified nurses who attended the courses during the study period, 672 volunteered to participate in the survey and 522 returned questionnaires (response rate of 77.7%). Information regarding non-respondents was unavailable. Of the respondents, 87.3% were woman (3.8%, $n = 20$, item non-response). Most of the sample were aged between 20 and 49 years (24.4% 20–29 years; 38.7% 30–39 years; 26.7% 40–49 years; 10.2% 50 years and older; 4.0% item non-response). More than four-fifths of the sample reported their highest educational qualification was either a Bachelor Degree (44.6%) or a Diploma in Higher Education (42.2%) while a minority reported other qualifications (4.0% Master's degree; 2.4% Post-graduate Diploma; 6.7% other qualifications; 5.1% item non-response). Most of the respondents (82.6%) worked in hospitals, 15.4% worked in the community, 1.8% worked in both hospital and community settings, and 0.2% worked in a university (5.1% item non-response). The respondents represented the full range of clinical specialties with 40.0% working in medicine, 24.4% in surgery, 8.4% in primary care, 8.1% in paediatrics, 7.5% in mental health, 4.1% in older people care, 3.9% in maternity, and 3.7% in ambulatory care (5.9% item non-response). Most of the respondents (96.6%) reported having direct patient contact. The average years of qualification as a nurse was 11.87 ± 8.746 years. A total of 172 (33.0%) nurses reported receiving the pandemic H1N1 vaccine in the 2009–2010 season and 107 (20.5%) reported intentions of vaccination in 2010–2011. Under half the sample ($n = 238$; 45.6%) reported recommending the H1N1 vaccination to their patients in 2009–2010 and 297 (56.9%) reported intentions to recommend the H1N1 vaccination to their patients in 2010–2011.

3.2. Knowledge and H1N1 vaccination

There were significant differences in the knowledge scores related to the pandemic H1N1 and vaccination between those vaccinated in the 2009–2010 season and those unvaccinated (see Table 1) with respondents with higher knowledge scores being more likely to receive the H1N1 vaccine than those with lower knowledge scores ($p = 0.017$). They were also more likely to have recommended the H1N1 vaccine to their patients ($p = 0.003$), and report a willingness to recommend vaccination to patients in the future ($p = 0.009$).