Influenza vaccination among Malaysian healthcare workers: a survey of coverage and attitudes

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ABSTRACT

Background: Healthcare workers (HCWs) are at increased risk of getting influenza than the general population, therefore putting patients at risk of nosocomial infection. Influenza vaccination coverage among HCWs is low despite the availability of a safe and effective vaccine. However, the reasons for such a poor uptake are not well reported in Malaysia. This study aimed at assessing the rate of influenza vaccination uptake, knowledge and attitude of healthcare workers regarding influenza, and employers' policy on influenza vaccination.

Methods: A cross-sectional questionnaire survey was conducted in three hospitals in the Klang Valley. Mann–Whitney test was used to assess possible differences in knowledge and attitude towards flu vaccination and the χ^2 was used for categorical variables. Analyses were performed with SPSS 22.0.

Results: A total of 690 questionnaires were distributed; 527 were returned (giving a response rate of 76.4%. The vaccine uptake was 51.4% with the majority (83.5%) of those believing they were vaccinated to protect themselves. Higher proportion of vaccinated HCWs ($p < 0.05$) agreeing to the fact that influenza is a serious threat to their health, however, 10% were not sure of its safety. Eighty-three (15.7%) claimed their employers did not have a vaccination policy, while 43.3% were not sure if their employers have vaccination policy.

Conclusion: This study has demonstrated more than half of the healthcare workers were vaccinated, with a significant proportion of the healthcare workers believed they were vaccinated to protect themselves, while most of those that were not vaccinated claimed they are worried about the safety of the vaccine. Most employers did not have a flu vaccination policy in place. Hence, the need for government to enforce such policy and make annual flu vaccination free and compulsory for all healthcare workers

KEY WORDS:
Influenza vaccination; vaccine uptake; healthcare workers; vaccination policy

INTRODUCTION

Seasonal influenza is responsible for up to three to five million severe illnesses annually worldwide, with a mortality of about 250 to 500 thousand.[1] It causes annual epidemics that peak during winter in temperate areas and the viruses can circulate worldwide affecting all age groups. It is an acute infection that is capable of spreading easily from person to person, causing severe illness and death in high-risk individuals. Influenza virus has a short incubation period of one to four days and its person-to-person transmission makes it hazardous to healthcare workers (HCWs) and patients, with HCWs considered as potential vectors for spreading the virus within healthcare facilities.[2] As such, it is a serious health problem that needs to be prevented, and the most effective way of prevention is by vaccination. Transmission of nosocomial influenza has been identified as an important cause of morbidity and mortality among patients, most especially in high-risk groups such as the elderly, children and the immunocompromised.[3-6] With HCWs an important reservoir for hospital transmission due to their closeness to patients or infected materials, they are particularly exposed to the influenza virus. However, they can be protected by vaccination. The United States Centers for Disease Control and Prevention (CDC) recommend that all HCWs should be vaccinated annually for influenza, and the benefits of this policy include a reduction in the risk of infection and influenza-like illness, minimising absenteeism, the prevention of hospital-acquired influenza infection and associated morbidity and mortality among their patients.[7] Similarly, Malaysia had issued guidelines for the use of seasonal influenza vaccines among HCWs, children, the elderly and those going on pilgrimage.[8] However influenza vaccination uptake has been reported to be decreasing over the years in some health centres in Malaysia.[9-11]

This shows that influenza vaccination coverage among HCWs is low despite the availability of a safe and effective vaccine. To the best of our knowledge, no study in Malaysia reporting the reasons for this poor uptake has been conducted. Therefore, for the first time, this study was undertaken in a cross-sectional survey at three hospitals in Kuala Lumpur and Selangor, Malaysia, to ascertain the rate of influenza vaccination uptake, the knowledge and attitude of HCWs regarding the influenza vaccine as well as the employers' policy on encouraging their workers' influenza vaccination uptake.

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MATERIALS AND METHODS

Study design

This study is a quantitative cross-sectional survey assessing flu vaccine-related knowledge and attitudes among HCWs, as well as employers' policy on influenza vaccination in the Klang Valley (Selangor and Kuala Lumpur), Malaysia. A self-administered questionnaire was distributed to HCWs of the selected hospitals.

Study area

This survey included HCWs from both government and private hospitals in Klang Valley areas (Selangor and Kuala Lumpur), Malaysia. A private hospital, public or government hospital and a private-government partnership hospital were selected for the survey.

Sample size

Sample size was arrived at using the sample size formula for estimating minimum sample size in a cross-sectional study: $N = Z^2pq/d^2$. Using a vaccination coverage rate of 21% (0.21)[12] the minimum sample size required for this study was therefore found to be 291. However, all 527 that responded to the questionnaire were included in the study in order to increase the precision of the sampling.

Sampling method

This flu vaccination survey was carried out using multi-stage random sampling. The first stage was the random selection of three health centres from the list of public and private hospitals in Kuala Lumpur and Selangor. Those hospitals that were picked but declined when contacted were replaced using the same sampling technique. The second stage was proportional sampling to allocate the number of HCWs to be selected from the hospitals, based on the calculated sample size. The third stage was also proportional sampling, to allocate the number of questionnaires to be given to each of the departments, and the fourth stage was the random selection of HCWs from the list of health staff within each department.

Questionnaire

The study tool used in this study was a self-administered questionnaire that was adopted and modified from the CDC cross-sectional survey (http://www.cdc.gov/flu/fluvaxview/national-flu-survey.htm). It included questions on socio-demographic variables and job history, past seasonal influenza vaccination status, attitudes towards vaccinating themselves and the reason(s) for not being vaccinated in the case of hesitation or unwillingness, regular contact with influenza or influenza-like illness patients as well as employers' policy on flu vaccination which was assessed by HCWs response Yes or No. The questionnaire also assesses the knowledge of the HCWs on influenza by asking respondents to rank their agreement with statements associated with influenza vaccination using a Likert scale from strongly agree to strongly disagree. Those whose response were agreed and strongly agree to a positive statement were considered to have good knowledge. The questionnaire was validated in a pilot survey conducted during a national conference involving HCWs in Kuala Lumpur.

Statistical analysis

The Mann-Whitney test was used to assess possible differences in knowledge and attitude towards flu vaccination in comparison with the responses between vaccinated and unvaccinated HCWs. Categorical variables (gender, job category and past vaccination history) were analysed using a chi-square test. For all statistical tests, a two-sided p-value below 0.05 was used as the level of statistical significance. Ninety-five percent confidence intervals (CI) are reported as appropriate. The data were analysed using SPSS 22.0 (SPSS Inc. Chicago, USA).

Ethical approval

Ethical approval was obtained from the Medical Research Ethics Committee, Ministry of Health Malaysia (NMRR-13-1541-17355), and the Universiti Putra Malaysia Human Ethics Committee. Written consent was obtained from the participants as appropriate for this study.

RESULTS

A total of 690 questionnaires were distributed; 527 questionnaires were fully completed and returned, with a response rate of 76.4% (527/690) by the HCWs across the selected hospitals involved in the study, of whom 420 (79.7%) were female. The median age was 30 years and the age range was 20 to 58 years, with the majority (56.5%) of respondents falling within the range 20 to 30 years. Of the 527 respondents, 409 (78%) were Malays, followed by Chinese (11%), Indians (8%) and others (3%).

The educational status of the respondents showed the majority (66.6%) of the HCWs attained an education level of diploma, followed by those with bachelor degrees (17.6%). Nurses/midwives constituted the greater part of the HCWs (49.3%), followed by technologists (16.7%) and clinicians (10.8%), with other HCWs constituting 23.2%. The nature of the work of the HCWs in this study is such that 424 (80.5%) of them were involved in direct care of patients, out of which 250 (53.1%) received the flu vaccination.

Of the 527 HCWs that participated in this study, 271 (51.4%) were vaccinated. The majority (52%) of those vaccinated were within the age range of 20 to 30 years, followed by age range 31 to 40 (37%), 41 to 50 (7%) and 51 to 60 (4%). On the other hand, most of those that were not vaccinated were between 41 and 50 years of age (61.3%), followed by 51 to 60 years (30.9%), while for the age groups 20 to 30 and 31 to 40 those not vaccinated represented 3.9% each. The 2013 flu vaccination coverage among different HCWs is as shown in Table I. The results for those that were vaccinated against flu from various departments showed that the Pharmacy department had the highest rate (70.59%) of unvaccinated HCWS followed with Other Medicine Sub-speciality (68.18%) while vaccine uptake rate was found to be higher among HCWs in Internal Medicine (78.57%), followed with Emergency Medicine (76.79%) as shown in Table II. A total of 295 (56%) of the HCWs had regular contact with flu patients in the course of their duty and 168 (56.9%) were vaccinated.

In this study, 261 HCWs believed they would definitely get vaccinated in the following year (2014), of which 166 (63.6%)

Table I: Knowledge of and attitude towards flu vaccination and comparison of responses between vaccinated and unvaccinated HCWs

	Vaccinated (n = 271)	Not vaccinated (n = 256)	Total (n = 527)	P value
The influenza vaccine is safe	219	177	396	0.000*
I am at risk of getting flu	237	206	443	0.144
Flu is a serious threat to my health	129	201	330	0.005*
Getting vaccinated is worth the time	179	146	325	0.001*
Flu vaccine protects me from getting the flu	217	183	400	0.010*
People around me are at risk of getting flu	242	214	456	0.033*
Flu vaccination may cause some people to get the flu	112	69	181	0.141
Flu is a serious threat to people around me	236	222	458	0.011*
People around me are better protected if I am vaccinated	190	156	346	0.005*

*Significant level at p value less than 0.05; n: number of staff who responded

Table II: Primary place of work and vaccination status

Place of work	Vaccinated against flu in 2013	
	YES (%)	NO (%)
Obstetrics and Gynaecology	28 (10.6)	26 (10.3)
Pharmacy	5 (1.9)	12 (4.7)
Laboratory Technicians	45 (17.0)	39 (15.4)
Paediatrics	41 (15.5)	62(24.5)
Internal Medicine	22 (8.3)	6 (2.4)
Family/General Practice	8 (3.0)	6 (2.4)
Geriatrics	1 (0.4)	-----
Other Medicine Subspecialist	14 (5.3)	30 (11.9)
Other Surgical Specialty	31(11.7)	41(16.2)
Emergency Medicine	43(16.3)	13 (5.1)
Others	26 (9.8)	18 (7.1)
Total	264	253

Table III: Knowledge of and attitude towards flu vaccination and comparison of responses between vaccinated and unvaccinated HCWs

	Vaccinated n = 271(%)	Not vaccinated n = 256(%)	Total n = 527(%)	P value
The influenza vaccine is safe	219 (80.8)	177 (69.1)	396 (75.1)	<0.0001*
I am at risk of getting flu	237 (87.5)	206 (80.5)	443 (84.1)	>0.05
Flu is a serious threat to my health	129 (47.6)	201 (78.5)	330 (62.6)	<0.005*
Getting vaccinated is worth the time	179 (66.1)	146 (57.0)	325 (61.7)	<0.001*
Flu vaccine protects me from getting the flu	217 (80.1)	183 (71.5)	400 (75.9)	<0.05*
People around me are at risk of getting flu	242 (89.3)	214 (83.6)	456 (86.5)	<0.05*
Flu vaccination may cause some people to get the flu	112 (41.3)	69 (27.0)	181 (34.3)	>0.05
Flu is a serious threat to people around me	236 (87.1)	222 (86.7)	458 (87.0)	<0.05*
People around me are better protected if I am vaccinated	190 (70.1)	156 (60.9)	346 (65.7)	<0.005*

*Significant level at p value less than 0.05; n: number of staff who responded

were vaccinated in the year under review (2013). The reasons given by those who were vaccinated were such that the majority (83.5%) believed they were vaccinated to protect themselves, while on the other hand, most of those that were not vaccinated claimed they did not need the vaccine, worried about side effects and its doubtful efficacy, and had a non-compulsory employer policy (Figure 1). The majority (68.5%) of the HCWs were not willing to take the risk of not taking the vaccine and, as a result, 53.7% of them were vaccinated in 2013. Of those surveyed, 331 (62.8%) believed that HCWs should be required to be vaccinated against flu, and 284 (51.6%) believed that there should be a reward or motivation for HCWs to have the vaccination. The results of this study showed a higher proportion of vaccinated HCWs ($p < 0.05$) agreeing to the fact that influenza is a serious threat to their health. Similarly, significant differences were found between vaccinated and unvaccinated HCWs using a Pearson chi-square test in terms of their response to influenza vaccine safety and protection (Table III). Our findings also indicated that those HCWs who were vaccinated against influenza did so to protect themselves, compared to those not vaccinated ($p < 0.05$). A typical HCW vaccine recipient trusted the vaccine's effectiveness ($p < 0.05$), more than those who did not receive the vaccine.

A significant proportion of the HCWs had a good knowledge of the transmission of the influenza virus as well as the signs and symptoms of infection. However, when asked whether flu

Table IV: Knowledge and attitude on flu vaccination*

About influenza	Strongly agree N (%)	Agree N (%)	Not sure N (%)	Disagree N (%)	Strongly disagree N (%)	No response N (%)
I am at risk of getting flu	151 (28.7)	292 (55.4)	58 (11)	19 (3.6)	2 (0.4)	5 (0.9)
People around me are at risk of getting flu	119 (22.6)	337 (63.9)	53 (10.1)	10 (1.9)	3 (0.6)	5 (0.9)
Flu is a serious threat to my health	93 (17.6)	337 (63.9)	57 (10.8)	31 (5.9)	5 (0.9)	4 (0.8)
Flu is a serious threat to the health of people around me	86 (16.3)	372 (70.6)	46 (8.7)	14 (2.7)	5 (0.9)	4 (0.8)
Flu vaccination can protect me from getting the flu	99 (18.8)	301 (57.1)	95 (18.0)	25 (4.7)	2 (0.4)	5 (0.9)
If I get a flu vaccination, people around me will be better protected from flu	72 (13.7)	274 (52.0)	139 (26.4)	36 (6.8)	1 (0.2)	5 (0.9)
Flu vaccination is safe	86 (16.3)	310 (58.8)	113 (21.4)	12 (2.3)	3 (0.6)	3 (0.6)
Getting vaccinated for flu is worth the time and expense	53 (10.0)	272 (51.6)	144 (27.3)	50 (9.5)	3 (0.6)	3 (0.6)
Health care workers should be rewarded for getting vaccinated for flu	112 (21.3)	284 (53.9)	97 (18.4)	29 (5.5)	1 (0.2)	2 (0.4)
Health care workers should be required to be vaccinated for flu	114 (21.6)	331 (62.8)	58 (11.0)	18 (3.8)	1 (0.2)	5 (0.9)
Influenza is more serious than a bad cold	101 (19.2)	301 (57.1)	108 (20.0)	15 (2.8)		2 (0.4)
Influenza virus is transmitted by contact with blood and body fluids	23 (4.4)	125 (23.7)	140 (26.6)	187(35.5)	49 (9.3)	3 (0.6)
Influenza virus is transmitted by coughing and sneezing	134 (25.4)	340 (64.5)	38 (7.2)	9 (1.7)		5 (0.9)
Healthcare workers are less susceptible to influenza infections than other people	24 (4.6)	140 (26.6)	102 (19.4)	211(40.0)	48 (9.1)	2 (0.4)
The signs and symptoms of influenza include fever, headache, sore throat, cough, nasal congestion, and aches and pains	137 (26.0)	343 (65.1)	33 (6.3)	10 (1.9)	2 (0.4)	2 (0.4)
People with influenza can transmit the virus before they experience symptoms	57 (10.8)	266 (50.5)	183 (34.7)	14 (2.7)	3 (0.6)	4 (0.8)
The influenza vaccination may cause some people to get influenza	20 (3.8)	161 (30.6)	207 (39.3)	119(22.6)	16 (3.0)	4 (0.8)
You can get vaccinated for influenza without an injection	33 (6.3)	73 (13.9)	209 (39.7)	165(31.3)	42 (8.1)	5 (0.9)

*Response with the highest number shown in bold

Table V: Vaccination status and employer's policy on flu vaccination

Does employer have any policy	Vaccinated against flu in 2014		Total (%)
	YES (%)	NO (%)	
Yes	121(45.0)	95 (37.7)	216 (41.5)
No	40 (14.9)	44 (17.5)	84 (16.1)
Not Sure	108 (40.1)	113 (44.8)	221 (42.4)
Total	269	252	521

Table VI: Employers' strategies to encourage employees on influenza vaccination

Services provided by employers	Vaccinated against flu		Total
	YES (%)	NO (%)	
Employer publicized the risks and benefits of influenza vaccination	202 (59.4)	138 (40.6)	340
Employer offered influenza vaccinations on site	239 (61.9)	147(38.1)	386
Free or subsidized cost of vaccination	113 (79.2)	55 (20.8)	168
Employer offered influenza's employee's temporary reassignment to an alternative work area	73 (59.8)	189 (48.8)	262
Employer offered influenza's employees paid leave or time off work	89 (62.2)	177 (47.5)	266
Employer offered influenza's employees Unpaid leave or time off work	39 (55.7)	227 (51.1)	266

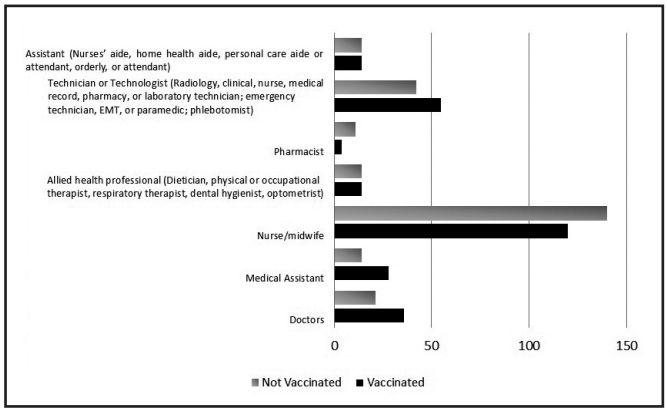

Fig. 1: Nature of job and vaccination status. The number in the represents the frequency of staffs.

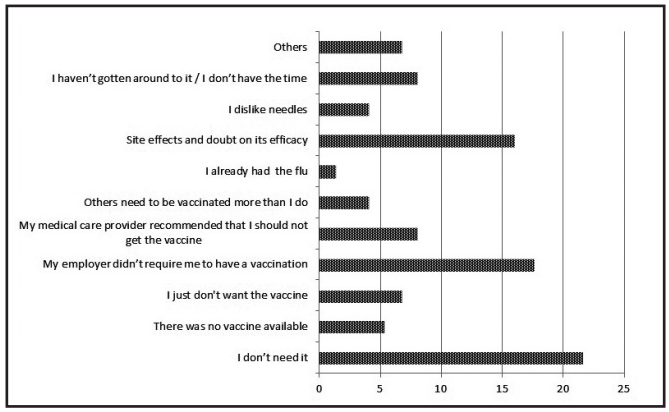

Fig. 2: Self-reported reason for non-receipt of flu vaccination among healthcare workers who were not vaccinated in 2013. The numer in the graph represents percentages (%) of staff what were not vaccinated.

vaccination may cause some people to be infected with influenza, 34.4% thought that was possible, while 39.3% were not sure details in Table IV.

This study assessed employer policy on flu vaccination from the employees. It was found that only 41.5% of the respondents believed their employers had a flu vaccination policy and only 56% were vaccinated, despite the existence of such a policy as shown in table V. Employers' strategies to encourage HCWs get vaccinated reveals, 61.9% of those that were offered influenza vaccination on site received the vaccine as shown in table VI.

DISCUSSION

Promoting annual influenza vaccination is effective in preventing influenza among HCWs, who are considered as a priority group for annual flu vaccination in this and many other national and international survey recommendations.[13] A flu vaccine uptake rate of approximately 50% is associated with a reduction of about 40% in mortality during the winter period, particularly among elderly patients in long-term care,[14] while vaccinating HCWs in tertiary care hospitals has been reported to be inversely related to the rate of nosocomial influenza infection.[15] In this study, we found an uptake rate of 51.4% among HCWs, which is in line with the uptake rate of more than 50% previously reported in a European study, but greater than that reported in a similar study in Chicago[16] and another similar report for HCWs in general.[17] In Malaysia influenza occurs throughout the year, based on the surveillance that has been conducted since 1997 there are two peaks: the major peak is observed from the months of April to August and a minor peak occurs in the months of October to January. Recently, a prevalence of 51% was reported in Malaysia from 2012 to 2014.[18] However, considering the fact that HCWs constitute one of the high risk groups, vaccine uptake rate of 51.4% might not be considered adequate.

Influenza vaccination among HCWs varies among category of the health care workers. Vaccine coverage was reported to be low among HCWs but can reach up to 89% among those in contact with high risk patients.[19] For flu vaccination coverage to increase there should be a willingness to be vaccinated, which in this study was found to be only 49.5%; this rate is closely related to that reported in a previous study.[20] In this study, 83.5% of the HCWs cited self-protection as the most common reason for getting vaccinated, which concurs with previous studies.[21] On the other hand, studies have shown that having doubts about vaccine efficiency and side effects,[22] as well as a lack of time,[21,23] were the primary reasons for non-receipt of the influenza vaccination. On the contrary, in this study, only 16% of the HCWs who were not vaccinated cited side effects and doubts about the efficiency of the vaccine as their reason for rejection, and only 8.1% said it was due to lack of time.

HCWs' knowledge and attitude towards influenza and its prevention have been studied in various countries.[13,24-27] A study conducted in Malaysia identified that educational level and occupation influenced the knowledge and attitude of the respondents on flu vaccination.[28] This is substantiated by the findings in this study, which found HCWs had good knowledge and attitude towards flu and its vaccination, as indicated by their response which showed that the majority (86.5%) believed they and the people around them, which includes patients, are at risk. About 81.5% of the HCWs also acknowledged that flu is a serious threat to their health and the health of those around them. However, 34.4% of the respondents believed that flu vaccination may lead to influenza infection. This is similar to other studies that reported 30% to 45% believed that the flu vaccine can cause influenza;[29,30] however, a study in Brazil reported a lower rate of 4%.[31]

Interactive health education and a free flu vaccination policy can increase vaccine coverage among HCWs. This is substantiated by the results of this study which revealed that employees who were reminded by their employers through pamphlets or handouts recorded a 61.3% uptake rate. This shows the importance of educating and reminding HCWs about flu vaccination.[32] Various strategies have been adopted

by healthcare employers to encourage HCWs to receive the flu vaccination voluntarily.[33-36] However, variability in strategy design is one of the limitations associated with employer-based flu vaccination policies. Providing on-site flu vaccination for HCWs, which is referred to as a convenient vaccination facility in several studies,[33-35] has been shown to be associated with a 61.9% vaccine uptake in this study. Previous studies showed that up to 90% of those who had taken the vaccine had received it at their place of work.[37] In this study, 31.9% of the HCWs said they were provided with free or subsidised flu vaccine by their employers, whereas a previous study among registered nurses revealed a 75% flu vaccine uptake as a result of their employer providing free flu vaccination to them.[38] However, this study is not without limitations in that, study included HCWs from both government and private hospitals in Klang Valley areas; as such it may not accurately reflect practices in other medical centres. The responses of the HCWs were self-reported, therefore, it is subject to social desirability that might constitute a bias and could not be independently verified.

CONCLUSION

In conclusion, this study revealed a 51.4% flu vaccine uptake rate among HCWs in selected hospitals in Klang Valley areas; therefore, it might not be a true picture of what is obtainable in other medical centres in Malaysia. Most of those that were vaccinated (83.5%) cite self-protection as the most common reason they were vaccinated. A significant proportion of the HCWs had a good knowledge of influenza virus transmission, as well as the signs and symptoms of infection; however, some of them still believed that flu vaccination may cause some people to become infected with influenza, while others were not sure. Only 216 (41%) of the HCWs believed their employers had a policy in place that encouraged flu vaccination. Therefore, there is a need for a campaign to intensify awareness among HCWs in order to enhance influenza vaccine uptake and its significance, as well as encouraging employers to provide free or subsidised influenza vaccination at their sites through government policy mandating annual flu vaccination for all HCWs.

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