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ORIGINAL ARTICLE

Influenza vaccination survey in Maltese Healthcare workers in the COVID-19 era

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Introduction

Seasonal influenza globally infects 5%-15% annually, with a total of 3-5 million cases of severe illness and ≤500,000 deaths. Hospital-acquired influenza has a particularly high mortality, and healthcare workers are frequently the source of these infections. This study was carried out to ascertain last year's influenza vaccination uptake in Malta's government sector healthcare workers, and estimate the likely vaccine uptake rate in the coming winter season when COVID-19 is expected to be prevalent.

Methods

A short, anonymous questionnaire was sent via the sector's standard email services (open 30/06-17/072020).

Results

There were a total of 735 (7.6%) responses from a total workforce of 9,681. The proportion of Maltese healthcare workers who did not take the vaccine last year but who are likely to take the vaccine this winter halved from 41% to 21%. Doctors had the highest baseline uptake (23% refused vaccination in 2019) and the highest likely uptake next winter (6% likely to refuse vaccination in 2020). Analysis by age showed a likely increase in vaccine uptake with increasing age across almost all age brackets.

Discussion

Influenza vaccination is advantageous and incurs a trivial burden. Clinicians, legislators and ethicists are increasingly aware of this aspect of healthcare, and increasingly mandate compulsory seasonal influenza vaccination for healthcare workers, where vaccine refusal can be taken to equate to maleficent practice. Education with regard to the low risk of side effects may increase voluntary uptake. Institutions are also responsible for ensuring employee vaccination, and this is even more the case for next winter in the setting of the potential co-circulation of novel COVID-19 with influenza.

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Introduction

Influenza-like illness is caused by over 200 different microorganisms (viruses and bacteria) with circa 10% caused by the influenza virus.[1] Seasonal influenza is a significant cause of morbidity and mortality and it is estimated that this virus annually infects 5% to 15% of the global population, resulting in 3-5 million cases of severe illness and up to half a million deaths.[2] Hospital-acquired influenza has a particularly high mortality, with an estimated median of 16%, rising up to 60% in high risk groups (e.g. transplant recipients and intensive care patients).[3,4] Healthcare workers who carry the virus have been frequently identified as sources of hospital-acquired outbreaks.[5]

The Centers for Disease Control strongly recommends annual influenza vaccination for all healthcare workers,[6] but vaccination rates remain poor,[7] despite models that show that a significant proportion of hospital-acquired burden of disease is vaccine preventable.[8]

The world is currently (2020) in the throes of the COVID-19 coronavirus pandemic,[9] and in the absence of an effective vaccine, next winter, this virus is likely to circulate in conjunction with seasonal influenza.[10] This study was carried out in order to ascertain last year's influenza vaccination uptake in Malta's government sector healthcare workers, and compare this with the projected uptake of the vaccine this coming winter.

Methods

A short (6 tick boxes), anonymous questionnaire was sent out to all of Malta's government sector healthcare workers via the service's standard email services. The period for which the questionnaire was open was from 30th June to 17th July 2020. The questionnaire was hosted via Google forms and exported to bespoke Excel spreadsheets for analysis.

The questionnaire was sent to all healthcare workers in the main hospital (Mater Dei Hospital), District Primary Care Health Centres, St Vincent de Paul Long Term Care Facility, Mount Carmel Mental Health hospital, Karin Grech Rehabilitation Hospital and miscellaneous other smaller facilities.

The questions, formatted in tick boxes, covered sex, occupation (medical, nursing, allied profession and other, with the latter including support staff such as in administration, ward clerks, cleaners, etc.), place of work (as above), age bracket, whether the influenza vaccine was taken last winter (yes/no), and how likely was the respondent to take the vaccine this coming winter (2020-21) on a Likert scale of 1-5. For the latter question, it was assumed that scores 1 and 2 were "no" and 4 and 5 were "yes". A score of 3 was discarded.

Chi tests and chi tests for trend were used except for one two by two table with small values wherein a Fischer exact test was used. A p value ≤ 0.05 was taken to represent a statistically significant result.

Results

A total of 9,681 questionnaires were posted electronically, with just 735 (7.6%) responses. The response rate ranged from 0.3-0.9% from healthcare workers outside Mater Dei, improving to 11.9% from healthcare workers based at Mater Dei Hospital (table 1). For this reason, analysis for workplaces outside of Mater Dei Hospital were amalgamated.

Table 1 Percentage response rates by workplace and occupation

Workplace	Total	Responded %	Occupation	Total	Responded %
Health Centre	1018	0.5	Medical	1472	12.3
Karin Grech	232	0.9	Nursing	2390	6.5
Mater Dei	5708	11.9	Allied profession	1705	14.4
Mount Carmel	723	0.4	Other	495	31.1
Other	200	21.5			
SVPR	1800	0.3			

Table 2 Percentages who answered "no" to whether they took influenza vaccine last year (2019) and whether will take vaccine next year (20202), overall and by sex, workplace and profession

% answer "no"	Overall	Females	Males	Mater Dei	Rest	Medical	Nursing	Allied profession	Other
Did not take	41	42	39	41	43	23	42	47	49
Will not take	21	21	21	21	17	6	23	26	27
chi	65.7	50.2	16.2	57.1	9.2	17.0	20.9	16.1	14.8
p	<0.0001	<0.0001	<0.0001	<0.0001	0.002	<0.0001	<0.0001	<0.0001	0.0001

Table 3 Percentages who answered "no" to whether they took the influenza vaccine last year and whether will take vaccine next year by age

% answer "no"	Last winter	Coming winter
18-24y	21	4
25-34y	39	20
35-44y	47	23
45-54y	51	30
55-64y	33	17
>64y	25	0
Chi for trend	2.3	4.2
p	0.1	0.04

Table 4 Statistical sub-analysis of age as per table 1.

% answer "no"	18-24y	25-34y	35-44y	45-54y	55-64y	>64y
Did not take	21	39	47	51	33	25
Will not take	4	20	23	30	17	0
chi	8.2	17.0	17.4	16.7	7.9	Fischer
p	0.004	<0.0001	<0.0001	<0.0001	<0.0001	0.3

Replies were received from 14.4% of allied healthcare workers, 12.2% of doctors and from 6.5% of nursing staff. Overall, the proportion of Maltese healthcare workers who did not take the vaccine in 2019 but who replied that they were likely to do so this winter, halved from 41% to 21% (table 2). This increase in vaccine uptake was reflected in both sexes and at all workplaces (table 2). Although, there was an increase in the 'projected' vaccine uptake across all healthcare workers by profession, this improved from approximately 45% of nurses and allied healthcare workers who did not vaccinate against influenza in 2019, to 25% in 2020. Doctors had the highest baseline uptake with 77% vaccinated against influenza in 2019, and only 23% declining vaccination in 2019., This group also reported the highest likely uptake next winter, resulting in the steepest projected decline in vaccination refusal rate with just 6% likely to refuse vaccination (table 2).

Analysis by age showed a significant likely increase in vaccine uptake across almost all age brackets (tables 3 and 4).

Discussion

It is encouraging to note that a higher proportion of healthcare workers intend to avail themselves of influenza vaccination next winter. This may be due, in part, to strong advice already being given in this regard by the Public Health Department The latter have announced that preparations are underway to develop a strategy to mitigate the impact of seasonal influenza come October, and that this may include the mandatory vaccination of vulnerable groups in order to minimise risks of a potential dual impact of seasonal influenza and COVID-19 on the country's healthcare system in winter 2020.[11] For this reason, in anticipation of expected demand, Malta has already ordered 200,000 vaccines, instead of the customary 100,000 usually ordered and given freely to vulnerable groups (for a population that approaches half a million).[11]

However, more can and should be done in order to raise the proportion of vaccinated workers as close to totality as possible. Clinicians, legislators and even ethicists are progressively more aware of this aspect of healthcare, and are increasingly mandating seasonal influenza vaccination for healthcare workers. Indeed, the Society for Healthcare Epidemiology has recommended that annual influenza vaccination should be a condition of employment for healthcare workers,[12] and this stance has been endorsed almost universally by professional bodies.[7] Ethicists have stated that:

> "given the mounting evidence for the efficacy of influenza vaccination in infection control […] the provision of health care by non-vaccinated health care workers is not merely suboptimal health care, but it is also at variance with generally accepted principles of health care ethics." [7]

Medical ethics upholds the twin principles of beneficence and non-maleficence. The former implies the promotion of patients' well-being and the latter can be summarised by the well known adage *primum non nocere*. Thus, "vaccination against influenza should be mandatory because practicing without vaccination is maleficent because it falls below the standard of medical care".[7]

Vaccination efficacy in healthcare settings

Prospective trials have demonstrated that the influenza vaccination of healthcare workers reduces influenza morbidity and mortality in influenza-vulnerable populations. This is especially the case in the elderly and in care homes.[13-16] It has also been estimated that "Need to treat" vaccination numbers in order to prevent one healthcare-associated patient death from influenza are as low as 11.4 to 125.7.[13-16]

Vaccination burden

The commonest reason for non-vaccination of healthcare workers is insufficient knowledge about the vaccine and its safety with irrational apprehension, and it has been shown that improved information about the vaccine improves voluntary vaccine uptake.[17] Our study partially supports this contention in that doctors were more likely to take the vaccine, both last year and with even greater likelihood next winter, and this may be due to greater knowledge in this group of healthcare workers. A ten year old study in Malta had shown that only 56.5% of healthcare workers availed themselves of free vaccination, and uptake depended mainly on their place of employment within the Health Service, whether they believed that vaccination caused actual influenza and whether they believed that vaccination was effective.[18] This type of analysis could not be done on this occasion as the number of responders outside of Mater Dei Hospital had to be amalgamated for statistical purposes.

There really is no excuse not to take the vaccine. Vaccine Adverse Event Reporting Systems have shown that medical contraindications are few, that side effects are mild and typically resolve within two days.[19-20]

Influenza vaccination side effects.[20]

- Soreness, redness, and/or swelling at the vaccination site
- Headache
- Fever
- Nausea
- Muscle aches

The rate of true serious adverse effects (e.g. severe allergic reaction) is circa 1 in 300,000 doses and this is far lower than the risk of pneumonia and/or death following influenza infection.[20] Cost (in Malta) is not an issue as the vaccine is available for free for healthcare workers, or at a nominal price of circa €10 if taken privately. There is minimal inconvenience in vaccine administration as it is offered at the workplace as a quick intramuscular injection.

Institutional Responsibility and the Influenza season 2020-21

Healthcare workers and their institutions accept professional responsibility for the care and well-being of their patients,[7] an accountability that is accompanied by the obligation to follow evidence-based practices.[21] Clearly, "institutions are obligated to enforce universal vaccination of their health care workers against seasonal influenza."[7]

In anticipation of increased influenza vaccine demand next season, manufacturers are ramping up production facilities. Indeed, a Reuters/Ipsos poll of 4,428 adults conducted between 13-19 May 2020 found that 60% of U.S. adults plan to take the vaccine, as opposed to the <50% uptake in this country.[22] Yet another survey between January and May showed willingness to take the vaccine increased from 34 to 65% and an increasing likelihood to take the vaccine at a pharmacy rather than a medical clinic or a healthcare center.[22] Demand for the vaccine is expected to be so heavy that options being considered are vaccine administration in parks, community centres and even home visits for vulnerable patients.[22] Heightened interest in influenza (and pneumococcal) vaccines is evident worldwide.[23]

This is partly driven not only by public health but also the possibility of "COVID-19 and flu, a perfect storm",[24] as well as by studies that show a potentially protective effect of the influenza vaccine on COVID-19 mortality in the elderly.[25]

Conclusions

Healthcare worker influenza vaccination clearly benefits patients, the vaccination burden is minimal and it is unethical for these workers not to take the vaccine.[7] Institutions should strongly promote employee vaccination uptake with educational campaigns that target misconceptions and reinforce the contention that vaccination is integral to ethical, beneficent, and professionally competent care.[7] Making the vaccine mandatory may also be an option.

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