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Research Article

Factors Affecting Influenza Vaccine Acceptance as the Most Effective Prevention Among Nurses in West Java, Indonesia

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Abstract

Background and Objective: In Indonesia, studies shows that not all nurses had been vaccinated, because no data is present according to which nurses had received influenza vaccine. Several reasons for not wanting to carry out influenza vaccination has resulted in number of influenza vaccine coverage among nurses, in this way it is a barrier for disease prevention. In this study factors that determine the acceptances of influenza vaccine are analyzed and recommendations made for the optimization of the vaccination programme.

Materials and Methods: This is a cross-sectional study design using comparative analysis with unpaired data. The study population were nurses at Annisa Medical Center (AMC) Hospital. Sampling was carried out by a simple random method with a minimum of 96 samples. Data collection was taken at the hospital by respondents filling self administered questionnaires. **Results:** The number of samples obtained in this study was 104 with details 94.23% (n = 98) are willing to accept influenza vaccination and 5.76% (n = 6) refuse influenza vaccination. Non Parametric Mann Whitney U-test was conducted to determine the difference in median value of two unpaired samples data. The significance value based on the test is 0.38. A chi square test was also conducted and found some factors associated to influenza vaccine acceptance (p<0.05). **Conclusion:** Not all nurses are willing to get influenza vaccination. From study, it can be seen that associated factors for acceptance of influenza vaccination are: knowledge, saving health costs, suitability of the vaccine content with belief and knowing where to get the influenza vaccine.

Key words: Knowledge, vaccine, influenza, acceptance, prevention

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Influenza is an infectious disease caused by influenza viruses transmitted from one infected person to another. Influenza viruses form antigenic variation resulting in new influenza serotypes that can lead to severe pandemics¹. The incidence of influenza in the world is around 3,000,000 B 5,000,000 per year, a lot of these cases are severe and cause 250,000-500,000 deaths each year².

The World Health Organization (WHO) stated that vaccination is the most effective way to prevent influenza disease now. The WHO stated that healthcare workers are one of the groups of people who got recommendation for influenza vaccination annually². Healthcare workers who got infected with influenza can be a source of transmission of the virus to fellow staff members or to their patients, even though the infection is not necessarily communicated from the patients³.

Data from the Center for Disease Control and Prevention³ showed the number of healthcare workers who had been vaccinated was 64.3%, experiencing an increase number from the previous year in 2013-2014, which was 62.9%. Most influenza based vaccinations are carried out by pharmacists (86.7%), assistant nurses or physician assistants (85.8%), doctors (82.2%), nurses (81.4%) and other health personnel (72.0%)⁴. This data showed that not all nurses has been vaccinated. A study conducted by Hulo *et al.*⁵ stated that the reasons for health workers who did not get vaccinated were generally caused by not having time, lack of safety in vaccines, fear of having influenza due to vaccination, ineffective, or doubting the benefits of vaccines to healthy staff. These hesitant reasons become a barrier to optimized vaccine coverage which may lead to deficient disease prevention.

Nurses as the object of this study were taken because they are healthcare workers who make direct contact every day to patients so they are at high risk of contracting the disease from patients and communicating it to other patients.

These problems are the background for authors to conduct a research to find factors affecting influenza vaccine acceptance among nurses in West Java, Indonesia.

MATERIALS AND METHODS

This is a cross-sectional study design using comparative analysis with unpaired data to determine nurses knowledge and factors towards influenza vaccine acceptance. The study population are nurses at AMC hospital in Bandung. Sample size was calculated using a cross-sectional formula for qualitative variables so that a minimum sample of 96 was obtained. Sampling was done by a simple random method. The inclusion criteria are nurses and exclusion criteria are nurses who refuse to participate in this study. Data was collected at AMC hospital during July, 2018 by nurses filling out questionnaires about knowledge, attitudes and acceptance of influenza vaccines.

The authors used a self-developed questionnaire about knowledge, attitude and acceptance of influenza vaccines. The knowledge questionnaire consisted of 19 questions using scoring by the Guttman scale (one = true and zero = false). Details of the topics assessed in the questionnaire are listed in Table 1.

The validity and reliability test of the questionnaire was done twice: The 1st time was done by 30 nurses in three primary healthcare services and the 2nd time was done by 30 nurses in a hospital. After the validity and reliability of the questionnaire was accomplished, authors got the α -cronbach with details for knowledge questionnaire $\alpha = 0.621$ and attitude questionnaire $\alpha = 0.778$, it means that this questionnaire can be used as a measurement instrument.

Ethical approval: This study has been approved by an ethical committee applied in March, 2018 at the Research Ethics Committee Padjadjaran University, Bandung, Indonesia number 211/UN6.KEP/EC/2018.

Table 1: Questionnaire topics

Knowledge			
Influenza disease	Influenza vaccine	Attitude	Acceptance
Definition	Definition	Cost	Willingness
Epidemiology	Mechanism of action	Side effect	Previous influenza vaccination
Risk factor	Purpose	Content	Place to get vaccinated
Classification	Benefit		Costs
Transmission	Side effect		Influenza vaccine information
Clinical manifestation	Recommendation		
Treatment	Contraindication		
Prevention	Schedule dan dosage		

RESULTS

Characteristic: The number of samples obtained in this study was 104 from a minimum sample of 96, with details 94.23% (n = 98) are willing to receive influenza vaccination and 5.76% (n = 6) refuse influenza vaccination.

Table 2 shows the characteristics of nurses at AMC Hospital based on age, gender, education, duration of working hours, length of working experience and previous season vaccination status. Respondents who are willing to accept influenza vaccinations mostly aged 20-29 years old group with number of 66.7%, while those who refuse influenza vaccination are balance in the 20-29 years old group and 30-39 years old with number of 50%. The division based on gender shows more women are willing to accept influenza vaccination as many as 66.3% while those who refuse influenza vaccination shows more men as many as 66.7%.

Knowledge: There are 2 free groups with a scale of data. The dependent variable is ordinal but not normally distributed. Non Parametric test namely the Mann Whitney U-test was carried out to determine the difference of data median value from two unpaired samples. The significance value based on the test is 0.38. This result rejects H_0 , which indicates a relationship between nurses knowledge score and influenza vaccination acceptance ($p < 0.05$).

Figure 1 shows the highest, median and lowest scores of nurses based on their willingness to accept influenza

vaccination. The median score of respondents who are willing to accept influenza vaccination is 11.6 while the median score of respondents who refuse influenza vaccination is 10. The highest score of respondents who are willing to receive influenza vaccination is 15 while the highest score of respondents who refuse influenza vaccination is 12. The lowest score of respondents who are willing to accept influenza vaccination is 7 while the lowest score of respondents who refuse influenza vaccination is 9.

The distribution of nurses knowledge questionnaire scores in this hospital based on their willingness to receive influenza vaccination is shown in Fig. 2. The graphic shows topics that most nurses didn't know are: The etiology of influenza, risk factors for influenza and contradictions to influenza vaccination.

Attitude: Table 3 shows the distribution of nurses answers for attitude questionnaires in this hospital based on their willingness to accept influenza vaccinations. Chi Square test was done to determine the relationship of nurses attitude towards influenza vaccine acceptance. The significance value of the statement saving health costs is 0.001 and the suitability of the vaccine content correspond to their beliefs is 0.003. These topics show attitude association towards influenza vaccination ($p < 0.05$). Attitudes statement about fear of side effects shows no association towards acceptance of influenza vaccination ($p > 0.05$).

Table 2: Respondents characteristics

Variables	Accept (n = 98)		Refuse (n = 6)		Total (n = 104)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age						
20-29	66	66.7	3	50.0	69	65.7
30-39	28	28.3	3	50.0	31	29.5
40-49	3	3.0	-	-	3	2.9
50-59	-	-	-	-	-	-
60-69	1	1	-	-	1	1.0
Gender						
Women	65	66.3	2	33.3	67	63.8
Men	33	33.7	4	66.7	37	35.2
Education						
Diploma	91	92.9	5	83.3	96	91.4
Sarjana	7	7.1	1	16.7	8	7.6
Duration of working hours						
≤8 h	70	71.4	5	83.3	75	71.4
>8 h	28	28.6	1	16.7	29	27.6
Length of working experience						
≤9 years	81	82.7	3	50.0	84	80.8
10-29 years	17	17.3	3	50.0	20	19.2
≥30 years	-	-	-	-	-	-
Previous season vaccination status						
Yes	2	2.0	-	-	2	1.9
No	96	98.0	6	100.0	102	97.1

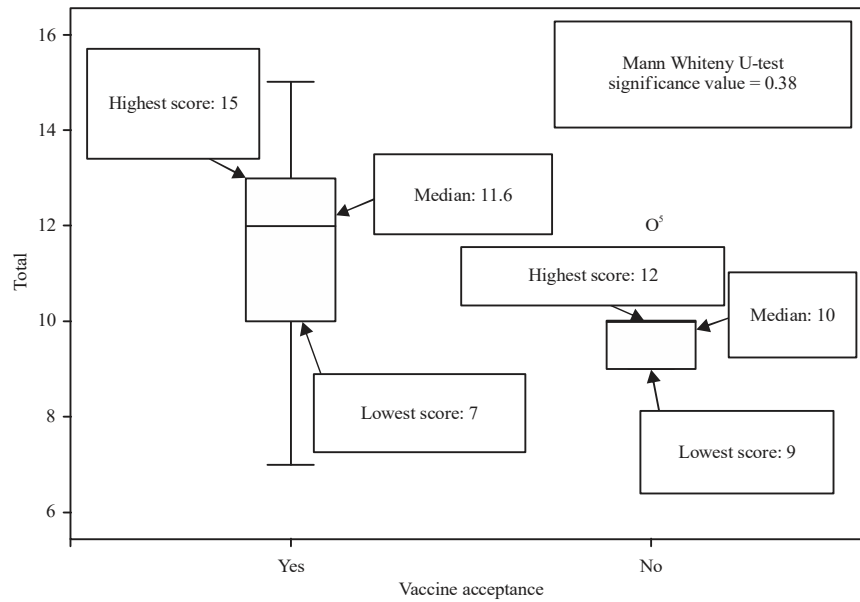


Fig. 1: Mann Whitney U-test

Table 3: Distribution and p value of attitude and acceptance

Statements	Acceptance (n = 98)		p-value*
	Yes	No	
Attitude			
In my opinion, the influenza vaccine can save medical costs			0.001
Agree	71	3	
Neutral	13	0	
Disagree	14	3	
I'm afraid if there are side effects that arise after influenza vaccination			0.125
Agree	35	3	
Neutral	25	0	
Disagree	38	3	
I do not have influenza vaccination for fear of the contents therein do not correspond to my beliefs			0.003
Agree	14	4	
Neutral	25	0	
Disagree	59	2	
Acceptance			
Did you get influenza vaccination on the previous season?			0.571
Yes	5	0	
No	93	6	
Are you afraid of the side effects that arise after influenza vaccination?			0.414
Yes	33	3	
No	65	3	
I know where to get influenza vaccine			0.041
Yes	58	1	
No	40	5	
I know influenza vaccine price			0.410
Yes	10	0	
No	88	6	
Have you ever done influenza vaccination before? ²			0.498
Yes	7	0	
No	91	6	
Have you ever heard information regarding influenza vaccine before?			0.323
Yes	53	2	
No	45	4	

*Chi square test (p<0.05)

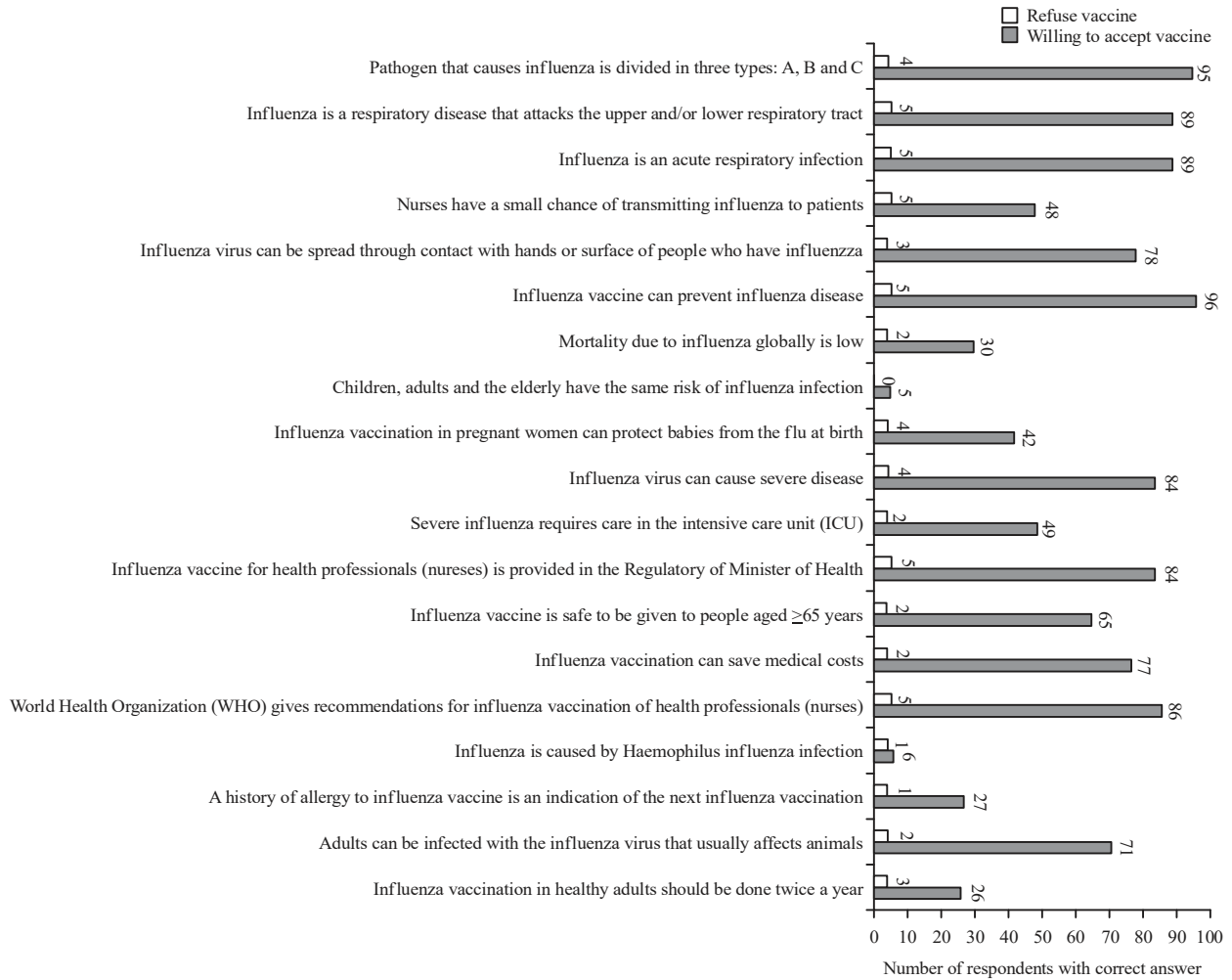


Fig. 2: Knowledge answer distribution

Acceptance: Table 3 shows the distribution of nurses answer for influenza vaccination acceptance questionnaires in this hospital based on their willingness to accept influenza vaccinations. The significance value of the statement where to get the vaccinated after the Chi square test was 0.041 indicating a relationship between knowing place to get the influenza vaccine and the acceptance of vaccination ($p < 0.05$). Other topics there are: History of influenza vaccination, fear of side effects, knowing the price of influenza vaccines and having heard information about influenza vaccines show no relationship towards acceptance of influenza vaccination ($p > 0.05$).

This acceptance questionnaire contains an open question regarding the reasons for refusing influenza vaccination, the respondents wrote down the reasons for refusing influenza vaccination because they feel that the immune system formed by the vaccine do not correspond with their beliefs and they are afraid if the vaccine might be illegal.

DISCUSSION

The result of this study showed a higher vaccine coverage compared to a study conducted by Millner *et al.*⁶, who divided healthcare workers based on their willingness to accept influenza vaccination, namely 63% ($n = 177$) would accept influenza vaccine and 37% ($n = 104$) refused influenza vaccination.

There are 5.1% ($n = 5$) out of 98 nurses who are willing to accept influenza vaccination had been vaccinated for influenza in the previous season whereas, none of the nurses who refuse influenza vaccination had done vaccination for influenza in the previous season. This finding shows influenza vaccine coverage in this setting is not good enough compared to Malaysia reaches 50% in 2010-2011 but better than Vietnam at 3.7% in 2011⁷.

Current research found not all nurses are willing to accept influenza vaccination even though there are a lot of findings which stated that vaccine is the most effective way to prevent disease, complication and death. WHO² stated that annual vaccination is the most effective way to prevent influenza disease. Report of the Strategic Advisory Group of Experts (SAGE) Working Group on Vaccine Hesitancy stated that vaccine worked on both individual and community level⁸. This report also stated that there is not any vaccine 100% effective but when used broadly in communities several vaccine preventable diseases could be eliminated and eradicated⁸. Global Vaccine Action Plan (GVAP) by WHO⁹ stated that Vaccination prevents an estimated 2.5 million deaths each year. The GVAP also described vaccination is essential for the future as part of a comprehensive package of interventions for disease prevention and control.

Authors appraise those statements as a suggestion for the government to make influenza vaccination as one of mandatory vaccination program for healthcare worker considering its benefits for individual and worldwide community health. There is a proof that mandatory immunization policy can increase vaccination uptake, in United States it was shown that mandatory influenza vaccine program for health care workers can increase vaccination uptake compared to voluntary programs where educating and incentives methods were used⁸. Not only in the USA but another study also found that mandatory policy was effective to increase healthcare worker's influenza vaccine acceptance up to 90%. However, this policy rose some issues because most of them did not support this policy and their vaccination decision most likely to be compliance¹⁰.

This study found a relationship between nurses' knowledge towards influenza vaccine acceptance from the obtained significance value of Mann Whitney U-Test is 0.38. Group of nurses who are willing to accept influenza vaccination had a higher score than the group who refuse influenza vaccination. The results of this study are consistent with a study in Italy which found that knowledge was associated with influenza vaccine coverage for healthcare workers therefore lack of knowledge about benefits of vaccines resulted in poor vaccine coverage¹¹.

The CDC in Picture of America about Prevention stated that there are 3 disease prevention framework: Local, state and national prevention¹². In order to create a successful and comprehensive disease prevention framework there are some efforts should be done to maximize disease prevention one of them is by rising education and awareness. The CDC also stated that healthcare worker's good knowledge about basic influenza vaccine and disease is needed to increase influenza

vaccine coverage to prevent influenza disease¹³. Based on those theories and findings authors develop questionnaire about knowledge, attitude and acceptance of influenza vaccine. There are several important topics about influenza disease and influenza vaccine which most nurses doesn't have knowledge about it. This study finds 93% of nurses who are willing to accept influenza vaccination and 100% of nurses who refuse to accept influenza vaccination didn't know that children and the elderly have a higher risk of contracting influenza compared to adults. This shows that nurses knowledge about the group of people at high risk for influenza is not enough, a study in England stated that children younger than 5 years and adults over 65 are more at risk of influenza¹⁴. There are 92% of nurses who are willing to accept influenza vaccination and 83% of nurses who refuse influenza vaccination did not know that the pathogen causing influenza is Influenza virus. Another important point which needs to be highlighted is 72% of nurses who are willing to receive influenza vaccination and 83% of nurses who refuse influenza vaccination didn't know that allergic history of influenza vaccine is a contraindication for the next influenza vaccine shot. These results show that education about basic influenza disease and vaccine is needed by nurses.

Fear of side effects showed no association with acceptance of influenza vaccination ($p = 0.125$). To *et al.*⁷ stated that things that prevents healthcare workers from vaccinating influenza is the fear of side effects, feeling ineffective, lacking in time and uncomfortable. This study shows a correlation between the vaccine contents towards their beliefs ($p = 0.003$). This result is similar to a study conducted by Pelcic *et al.*¹⁵ in Europe and Asia which stated that there was an increase in rejection of vaccinations caused by religious reasons. However, although vaccination might be contradictory to beliefs, vaccination is still permissible if it can protect more lives and the wider community¹⁵. Another result of attitude is the nurses tend to save on health costs by influenza vaccination ($p = 0.001$). This supports the WHO statement¹⁶ that one of the goals of vaccination is to save on health costs, vaccination is the 4th order out of 30 effective ways to advance global well-being. The 2011 record reported the number of influenza cases is 3,990,894. One unit visit cost at that time was Rp. 208,337 with assumption¹⁷ that outpatient cases were only one visit, then the total direct costs were Rp. 831,441,508. This high number of illnesses caused high costs incurred by the community to treat influenza. National Vaccine Advisory Committee (NVAC) showed some studies funding for influenza vaccine could be lower than unpredictable costs to treat the disease therefore vaccine is a great step to prevent economics burden¹³.

Nurses knowing where to get influenza vaccine shows an association towards influenza vaccine acceptance ($p = 0.041$). These result is consistent with a study conducted by Zhang *et al.*¹⁸ which stated that availability of comfortable vaccination services will increase vaccination acceptance rates. Therefore, authors suggest vaccine providers to increase their promotion towards influenza vaccine and provide a comfortable service. Previously mentioned the research conducted by To *et al.*⁷ in Asia stated that fear of side effects prevent healthcare workers from doing influenza vaccination. The result of this study is different from those of the study which found fear of side effects has nothing to do with acceptance of influenza vaccination ($p = 0.414$). Ricco *et al.*¹¹ study mentioned that one of the reason for healthcare workers didn't do influenza vaccination was because they had been vaccinated in the previous season. That statement doesn't correspond with the result of this study which found a history of influenza vaccination was not associated with influenza vaccine acceptance ($p = 0.571$). The price of influenza vaccine is not related to the acceptance of influenza vaccination ($p = 0.410$). Furthermore, this finding correspond with a research conducted by Seale and MacIntyre¹⁹ in Australia and McLennan *et al.*²⁰ in New Zealand which stated that giving vaccinations for free do not increase vaccination rates. This statement is proved by a data showing vaccine coverage for healthcare workers is less than 50% regardless of free vaccines. Whereas a different finding by Black *et al.*²¹ in the United States stated that vaccination rates increased when healthcare workers are required to get vaccinated and get vaccines for free. This study also found that knowing vaccine information was not related to acceptance of influenza vaccination ($p = 0.323$). This finding tune in with Llopia *et al.*²² statement that hesitancy may not be simply overcome by providing more information or even enhancing risk perception.

Influenza disease is a serious concern due to its burden on health and economic sector. Data shows that influenza vaccine coverage among healthcare workers is still considered low. Therefore, NVAC develop a recommendation and strategies to increase influenza vaccine coverage for healthcare workers, which not only include promoting vaccine but also a comprehensive influenza prevention¹³.

There are several limitations of this study. This result does not represent nurses' coverage of influenza vaccination in Indonesia as a whole country because it is only conducted at a hospital in West Java. Information bias might be occurred due to errors in filling out questionnaires because the respondents filled out this questionnaire without guidance from authors.

CONCLUSION

The results of this study indicate that influenza vaccination education for nurses can influence the acceptance of the implementation of the immunization program to be significantly improved. Associated factors towards acceptance of influenza vaccination are: knowledge, saving health costs, suitability of the vaccine content with belief and knowing where to get the influenza vaccine.

SIGNIFICANCE STATEMENT

This study discovers the possible aspects of nurses' attitudes and acceptance of influenza vaccination programs are expected to increase effectiveness with high awareness in motivating people to be more aware of influenza prevention to their family members. This study will help the researcher to encourage health worker to repair misperceptions about influenza risk and severity, or lack of confidence in vaccination effectiveness, or fears about vaccine safety or side effects. Efforts are needed to increase the absorption of vaccines, it is proposed to increase the awareness and knowledge of health workers more attention in order to help increase motivation in preventing influenza.

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