

Home care nurses' knowledge, attitudes, and practices towards influenza vaccination

Name student: Joke T. Jongen
Student number: 6203973
Course: Research Internship 1: Proposal
Status: Concept
Date: 18/06/2020
Course mentor: Dr. A. Huis
Course lecturer: Dr. R. Zwitterlood
Education: Master Nursing Sciences, Clinical Health Sciences, Utrecht University,
UMCUtrecht, The Netherlands
Internship institution: Radboud University Medical Center, Radboud Institute for Health
Sciences, Scientific Center for Quality of Healthcare (IQ healthcare),
Nijmegen, The Netherlands
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English abstract

Title: Home care nurses' knowledge, attitudes, and practices towards influenza vaccination.

Background: Infectious diseases, including influenza, are creating a significant burden of disease on both patients and the healthcare system. Since nurses are key vectors in the spread of influenza, vaccination in nurses is an effective way of prevention. Previous research on this subject has focused on different settings, little is known about the knowledge, attitudes, and practices of home care nurses.

Aim: To explore the knowledge, attitudes, and practices towards influenza vaccination.

Method: A quantitative, descriptive study using an online, cross-sectional survey was conducted among Dutch home care nurses between March - April 2020. A translation of the King's Nurses Influenza Vaccination Questionnaire was used to question; knowledge about influenza and the influenza vaccination, perception of the risk, health beliefs, practices regarding influenza vaccination and, reasons to get or not get influenza vaccination. SPSS Statistics version 25 was used to conduct data analysis using descriptive statistics, chi-square test and one-way ANOVA.

Results: The vast majority of the 449 respondents was not vaccinated for seasonal influenza over the last 12 months (n=358, 79,7%) or the last 5 years (n=318, 70,8%). A significant difference was found between the vaccinated and unvaccinated groups in years of work experience, age, knowledge, perceptions, intention to get vaccinated next year and recommendation of vaccination to clients.

Conclusion: The vaccination rate among home care nurses is low, representing a quite negative attitude towards influenza vaccination. This attitude is related to their age, work experience, knowledge level, perception of risk of influenza and intention to recommendation of vaccination to clients in the future.

Recommendations: By implicating these findings in education programs and motivational campaigns efforts should be made to improve the knowledge, attitudes, and practices of nurses.

Key words: Nurse, Home care, Influenza, Vaccination, Attitude

Nederlandse samenvatting

Titel: De kennis, houding en handelen van thuiszorgverpleegkundigen ten aanzien van influenzavaccinatie.

Achtergrond: Infectieziekten, zoals influenza, vormen een aanzienlijke ziektelast voor zowel patiënten als de gezondheidszorg. Omdat verpleegkundigen een belangrijke bron zijn van verspreiding van influenza, is vaccinatie bij verpleegkundigen een effectief preventiemiddel. Eerder onderzoek naar dit onderwerp was gericht op andere settings, er is weinig bekend over de kennis, houding en praktijken van thuiszorgverpleegkundigen.

Doel: Verkenning van kennis, houding en handelen van thuiszorgverpleegkundigen ten aanzien van influenzavaccinatie

Methode: In maart en april 2020 is een kwantitatief, beschrijvend onderzoek uitgevoerd met behulp van een online, cross-sectioneel onderzoek onder Nederlandse thuiszorgverpleegkundigen. Een vertaalde versie van de King's Nurses Influenza Vaccination Questionnaire werd gebruikt om vragen te stellen over; kennis van influenza en de influenzavaccinatie, risicoperceptie, gezondheidsovertuigingen, handelen rondom influenzavaccinatie en redenen om al dan niet influenzavaccinatie te nemen. SPSS Statistics versie 25 werd gebruikt om data-analyse uit te voeren met beschrijvende statistieken, chi-kwadraattest en eenweg-ANOVA.

Resultaten: De overgrote meerderheid van de 449 respondenten was de afgelopen 12 maanden (n=358, 79,7%) en de afgelopen 5 jaar (n=318, 70,8%) niet ingeënt tegen seizoens-influenza. Er was een significant verschil tussen de gevaccineerde en niet-gevaccineerde groepen in jaren werkervaring, leeftijd, kennis, percepties, de intentie om volgend jaar te worden gevaccineerd en de intentie voor aanbeveling van vaccinatie aan cliënten.

Conclusie: De vaccinatiëgraad onder thuiszorgverpleegkundigen is laag, wat duidt op een vrij negatieve houding ten aanzien van influenzavaccinatie. Deze houding hangt samen met leeftijd, werkervaring, kennisniveau, perceptie van het risico op influenza en de intentie om vaccinatie aan cliënten aan te bevelen.

Aanbevelingen: Door deze bevinding te verwerken in onderwijsprogramma's en motiverende campagnes zou ernaar moeten worden gestreefd de kennis, houding en praktijken van verpleegkundigen te verbeteren.

Trefwoorden: Verpleegkundigen, Thuiszorg, Influenza, Vaccinatie, Houding

Introduction

Infectious diseases are a leading cause of death worldwide, creating a significant burden on both patients and the healthcare system¹. Infectious diseases are caused by bacteria, viruses, fungi, or parasites that are passed on, directly or indirectly, from one person to another¹. One of the most common infectious diseases in developed countries is influenza². Influenza is a viral infection that is easily spread through respiratory droplets³. The World Health Organization estimates that annual epidemics of influenza result in approximately 3 to 5 million cases of severe illness and 250,000 to 500,000 deaths⁴. Each year an estimated 5 to 10% of adults and 20 to 30% of children are infected⁴. The influenza virus undergoes spontaneous genetic mutations which allows new viral strains to spread rapidly, making influenza a challenge for the healthcare system and a threat to patients⁵.

Influenza vaccination is considered the most effective way to prevent influenza³. Studies have shown that healthcare workers (HCW) are a key vector in the spread of influenza, with transmission of influenza between patients and HCW⁶⁻⁹. Although evidence is limited and of moderate quality, vaccination of HCW seems to be beneficial for both HCW and patient¹⁰. First, it can reduce the risk that HCW infect vulnerable groups of patients with influenza by transmitting the virus¹⁰⁻¹¹. For example, Frenzel et al shown a significant decrease in influenza infections amongst cancer and hematological patients when vaccination rate was high amongst nursing staff¹². If all hospital staff is vaccinated, about half of influenza cases among patients can be prevented¹³⁻¹⁴. Thereby, according to literature increasing the vaccination rate among HCW results in fewer dropouts due to illness during an epidemic¹⁰. This is beneficial for HCW themselves, their employers and continuity and quality of healthcare⁹⁻¹⁰. A randomized, double-blind controlled trial amongst hospital staff showed a reduction in sickness absence of nearly half a day per vaccinated employee⁶.

Despite evidence of beneficial effects, clear recommendations from healthcare-organizations and many campaigns to motivate HCW to be vaccinated, vaccination rates amongst HCW remain low⁹⁻¹⁰. Interestingly, vaccination rates among nurses, who often are in closest contact with patients, are remarkably lower than those of other HCW like physicians¹⁵⁻¹⁷. A study amongst Dutch hospital nurses showed a vaccination rate of 13 percent¹⁸. Vaccination rates of nurses in other fields, like home care, are unknown. Literature shows important reasons for vaccination are self-protection and protection of others¹⁹⁻²⁵. Leading factors influencing a positive attitude towards vaccination are: knowledge about influenza vaccination, previous vaccination,

and belief in the benefits of vaccination. Most important reasons not to get vaccinated are: concerns about safety and side effects, belief in natural immunity or other measures and concern about negative effects on their own medical condition. Leading factors influencing a negative attitude are: A high risk perception of vaccination and a low risk perception of influenza¹⁹⁻²⁵.

Previous research on influenza vaccination in nursing staff has focused on hospital or nursing home settings. Health care is changing worldwide and as a result, the field of home care is growing rapidly²⁶. Results of previous research cannot be generalized to the home care setting, because hygiene, client- and organizational factors vary. Home care nurses are a guest in their clients' house, it is a more uncontrolled setting in terms of hygiene aspects²⁶. The variety and severity of diseases between patients is often more diverse and patients are less likely to be vaccinated, compared to hospital settings¹⁰. The organizational factor, such as facilitation of vaccination of nurses by the organization can vary and is often not as normalized, organized and promoted as in hospitals¹⁰. Therefore it is essential to gain more knowledge on home care nurses' knowledge, attitudes, and practices towards influenza vaccination.

Aim

The aim of this study is to explore home care nurses' knowledge, attitudes, and practices towards influenza vaccination.

Method

Design

This is a quantitative, cross sectional study which suits the goal to analyze data from a broad population at a specific point in time²⁷. An online survey was used, because this facilitates collection of data from geographically dispersed respondents in a timely and cost effective manner²⁷.

Population & Domain

The study domain is home care nursing. The population consisted of nurses working at Buurtzorg, which is the largest home care provider of the Netherlands with 14500 employed home care nurses²⁸. The research team aimed for a sample size of at least 500 respondents, this is expected to produce a sufficient representation of reality in this type of research²⁹⁻³¹. Buurtzorg works with more than 1000 self-directing teams with a maximum of 12 nurses per team with different qualification levels (see Table 1). In order to be included to this study, nurses

had to be able to read and write in Dutch and to perform basic computer skills. Freelance nurses and student nurses were not included.

(TABLE 1 HERE)

Data collection - procedure

Participants were recruited through an email containing an information letter and the link to the questionnaire in Lime survey. The email was sent to all 22 team coaches within Buurtzorg, representing all teams within the organization, with the request to forward this to their teams. The information letter and link to the questionnaire were also posted on Buurtzorg's online community. This ensured that all nurses employed by Buurtzorg (14500) were able to participate. Nonresponse was reduced by a follow-up email and message on the online community ten days after the original invitation. Data was collected between March 30th and April 20th 2020.

Data collection - questionnaire

The main study outcome is to gain insight of knowledge, attitudes, and practices of home care nurses towards influenza vaccination. This was measured by a translated version of King's Nurses Influenza Vaccination Questionnaire (KNIVQ). This questionnaire entails five parameters: Knowledge about influenza and influenza vaccination, Perception of risk of influenza and pandemics, Health beliefs, Practices regarding influenza vaccination and Reasons to get or get not vaccinated, including all aspects of nurse's knowledge, attitudes, and practices towards influenza and influenza vaccination, according to literature³². KNIVQ was proved of high reliability and validity, with a Cronbach's alpha coefficient score of 0.78³². Permission to use and translate this questionnaire was obtained. The translation (KNIVQ-D) was created using forward-backward translation³³ in collaboration with a native speaker (in both English and Dutch). Cultural adjustment and face validity were checked by two nurses, and consensus was sought to shape the final version.

KNIVQ-D consists of 67 questions. The first five questions address demographic characteristics, including age, function level, years of work experience, province of the Netherlands where the team is located, and number of clients at that moment. Remaining questions are divided in five sections, each focusing on a different parameter. Section A, a knowledge test, contains 30 statements about influenza and its vaccination with possible answers: 'true', 'false' or 'I don't know'. Section B addresses perception of nurses towards influenza and vaccination in 12

questions on a five-point Likert-scale. Section C is based on the Multidimensional Health Locus of Control Scale³⁴, it contains 18 questions on a six-point Likert-scale about respondents' health beliefs. The scale contains three subscales covering aspects of the Health Locus of Control; Internal believes, Chance and Powerful Others. Section D focusses on vaccination practices in the past and intentions for the future, containing questions about seasonal influenza and four about Influenza A (H1N1) practices, with possible answers: 'yes', 'no' or 'I do not want to answer this question'. In section E respondents have to name three reasons to get vaccinated and three reasons not to get vaccinated. The first screen of the questionnaire asked for an informed consent, by going to the next screen a participant gave permission. All questions of a section were mandatory before proceeding to the next section.

Data analysis

SPSS Statistics version 25 (IBM, Chicago) was used to conduct data analysis. Since all questions were mandatory, there was no missing data within filled out sections, only when a participant stopped filling out the questionnaire. The choice was made to only use data of respondents that filled out the questionnaire up to and including section D, since this section contains most important outcome measures about vaccination behavior. Descriptive statistics were used to analyze demographic characteristics. The five parameters were analyzed individually calculating item-scores, subscale-scores and total-scores. One item in section B needed to be reversed, because it was negatively formulated. A chi-square test was used to explore differences in the main variables of section A, B, C and D between vaccinated and unvaccinated groups. When necessary to fit the criteria of performing a chi-square test, variables were divided into two groups by the mean, creating a 'high'- and 'low'- group of the variable. This applied to the variables; Age, Total-Knowledge-score, Risk-perception-score, Internal-Believes, Chance and Powerful-Others. A one-way ANOVA was used to explore difference amongst respondents characteristics and main outcomes of section A, B and C. P-values < 0.05 were considered statistical significant. The open end questions in section E were categorized using thematic content analysis by the main researcher. In case of doubt categories were assigned through consultation with the research group.

Ethical issues

This study was conducted according to Research Code of the IQ Healthcare centre at Radboud University and the principles of the Declaration of Helsinki, version October 2008³⁵. The Dutch General Data Protection Regulation³⁶ also applies to this research.

Results

A total of 665 nurses responded to the questionnaire, 495 completed at least section A and 452 completed until section D. Three nursing students were excluded, so analysis was conducted on a dataset of 449 questionnaires, this corresponds to 68 percent of the respondents (see Figure 1).

(FIGURE 1 HERE)

During analysis the research team notified some questions about H1N1 did not fit current situation in the Netherlands, because seasonal influenza vaccines also provide protection against H1N1. Moreover, this specific virus has not been active in the Netherlands last few years³⁷. Therefore questions whether respondents got vaccinated for H1N1 last 12 months and if respondent plans to get vaccinated with H1N1 were not analyzed. The other questions about H1N1, expected to contain valuable information, were analyzed.

The mean age of respondents was 46.9 (SD 12.5) years. Most respondents had a qualification level of 4 (n=169, 37.6%) or 5 (n=194, 43.2%). A majority (n=302, 65.2%) had between 10-40 years of work experience. Although all provinces of the Netherlands were represented in the sample, four provinces represented more than half of the sample; Gelderland (21.4%), Overijssel (12.7%), Groningen (12.0%), Utrecht (11.8%). The teams were taking care of 33.4 (SD 11.5) clients at the moment of filling out the questionnaire.

Vaccination practices

The vast majority of respondents was not vaccinated for seasonal influenza over the past 12 months (n=358, 79.7%), or the past 5 years (n=318, 70.8%). There was a significant difference ($F=3.906$, $p=0.002$) in years of work experience between seasonal vaccination status over the past 12 months, with more experienced nurses more likely to be vaccinated. Also, a significant ($X^2=9.848$, $p=0.002$) difference was found in age between vaccination status groups, with older nurses more likely to be vaccinated. There were no significant differences in other characteristics between vaccinated and unvaccinated groups.

About a quarter of respondents (n=110, 24.5%) intends to get vaccinated for seasonal influenza next year, while the majority (n = 245, 54.6%) intends not to get vaccinated and one fifth (n=94, 20.9%) is indecisive. A significant difference ($X^2=284.564$, $p=0.000$) was found between current seasonal vaccination status and intention to get vaccinated next year, with vaccinated nurses being more likely to intent getting a vaccination next year. Two third of respondents (n = 299,

66.6%) has recommended clients to get vaccinated for seasonal influenza in the past. Similarly, 264 nurses (58.8%) intent to recommend clients to get vaccinated for seasonal influenza in the future. Nevertheless, there was no significant difference between seasonal vaccination status and recommendation of vaccination to clients in the past. A significant association ($X^2=12.027$, $p=0.002$) was found between seasonal vaccination status over the past 12 months and intention to recommend vaccination to clients in the future, with vaccinated nurses more likely to recommend vaccination. Only one third of respondents ($n=152$, 33.9%) has recommended clients to get vaccinated for H1N1 in the past and the same number intents to do so in the future.

Knowledge

Analysis of section A leads to following knowledge scores; the mean Seasonal-Knowledge-score of respondents was 15.8 (SD 2.6) out of 22, the mean H1N1-Knowledge-score was 3.8 (SD 1.8) out of 8, and the mean Total-Knowledge-score was 19.6 (SD 3.6) out of 30. These scores imply the presence of basic influenza knowledge amongst respondents, with less knowledge about H1N1 than seasonal influenza. Table 2 shows knowledge items about seasonal influenza and H1N1 with the highest percentage of incorrect answers. Remarkably, a large proportion of participants gave incorrect answers to several questions, concerning items about both seasonal influenza and H1N1 questions. The question whether the H1N1 vaccination also protects against seasonal influenza was scored most incorrect, 200 (44.5 percent) respondents mistakenly believed this to be true. The most incorrect scored questions concerning seasonal influenza covered side effects of the vaccination. A significant difference ($X^2=14.263$, $p=0.000$) was found between knowledge groups and seasonal vaccination status, with nurses belonging in the high knowledge group more likely to be vaccinated. There was a significant difference ($F=4.640$, $p=0.003$) in knowledge scores between level 5 nurses and level 3 and 4 nurses. No significant differences were found in knowledge scores for other characteristics.

(TABLE 2 HERE)

Risk perception

Analysis of section B shows a mean Risk-perception-score of 2.11 (SD 0.91). This indicates in a moderately low risk perception of influenza amongst respondents. The risk perception towards seasonal influenza ($\bar{x}=2.4$) was slightly higher than towards H1N1 ($\bar{x}=2.0$). Items with the lowest and highest mean scores are presented in Table 3. Remarkably, lowest and highest mean scores are contiguous and all mean scores represent disagreeing or strongly disagreeing

attitudes. A significant difference ($\chi^2=15.184$, $p=0.000$) was found between perception groups and seasonal vaccination status, with nurses with a high risk perception more likely to be vaccinated. There were no significant differences in Risk-perception-scores for any of the respondent-characteristics.

(TABLE 3 HERE)

Health beliefs

In section C, respondents agreed most with statements of the subscale Internal believes ($\bar{x}=2.9$), suggesting respondents believe their own behavior influences their health. On average, respondents disagreed with statements of the subscales Chance ($\bar{x}=3.9$) and Powerful Others ($\bar{x}=4.5$). This indicates respondents believe that neither chance, nor others (medics/social environment) have a substantial impact on their health. Items with the most and least agreement are presented in Table 4. The most agreed items indicate respondents aim to take care of and influence their health. The least agreed items represent the dismissive attitude towards healthcare professionals or chance being accountable for respondents' health. Data showed no significant difference between low- and high-score-groups of the subscales and vaccination status. Significant differences were found in Internal-believe-scores for age ($F=1.464$, $p=0.03$), function level ($F=2.754$, $p=0.042$) and years of work experience ($F= 3.268$, $p=0.007$). There were no significant differences in Chance-scores or Powerful-Other-scores for any of the respondent-characteristics.

(TABLE 4 HERE)

Reasons to get or not get vaccinated

In section E more than 90 percent of respondents, both vaccinated and unvaccinated, gave at least one reason to the open end questions why they might get ($n=409$) or not get ($n = 410$) vaccinated. Content analysis of these items resulted in 11 categories of reasons to get vaccinated and 9 categories of reasons not to get vaccinated (see Table 5). Three main reasons to be vaccinated were: 'Own health status', 'To protect self' and 'To protect others'. Amongst comments categorized as "Own health status", respondents mentioned they were part of risk groups, suffer from comorbidity or specific conditions like diabetes, heart failure, asthma or were past smokers. Three main reasons respondents gave not to be vaccinated were: 'No need', 'Concern about vaccine's effectiveness/safety' and 'Fear of side-effects/getting ill'. Amongst comments categorized as 'No need', respondents mentioned not ever/often getting influenza,

low age, being healthy, not belonging to a risk group, not being recommended/obligated, colleagues not getting vaccinated and staying home while ill to prevent infecting others. Many respondents expressed 'Concern about vaccine's effectiveness/safety', they stated that the vaccine does not help against all types of influenza, safety and risks are not or insufficiently tested or that the vaccine could contain components that are harmful for their health.

(TABLE 5 HERE)

Discussion and recommendations

Main findings

The main aim of this research was to explore home care nurses' knowledge, attitudes, and practices towards influenza vaccination. The results show that vaccination rate of Dutch home care nurses is suboptimal, despite all recommendations and campaigns. This is very deplorable, as research suggests vaccination is beneficial for both HCW and patients. Van den Dool et al state approximately 60% of influenza virus infections amongst patients can be prevented when HCW vaccination rate increases from 0 to 1¹⁴. The exact effect of increased vaccine uptake amongst nurses remains hard to determine, due to variations between study designs, settings, severity of seasonal influenza epidemics, and failure to control all effect modifiers. However, it is stated vaccination of every additional HCW protects an additional fraction of patients¹⁴.

Remarkably, in the present study a far larger group of respondents stated to have recommended vaccination to clients in the past and intent to do so in the future, than being vaccinated themselves. This could imply home care nurses take recommendations from the Dutch government about vaccinating risk groups more seriously³⁸ than recommendation about vaccination for themselves.

This study demonstrates that nurses' influenza vaccination practices can be influenced by their age, work experience, knowledge level, perception of risk of influenza and intention to recommendation of vaccination to clients in the future. These outcomes are similar to previous research in different settings³⁹⁻⁴⁰. The association between age and work experience, and vaccination status, is likely to be influenced by recommendation from the Dutch government that every person above the age of 60 should get vaccinated³⁸. The fact that respondents over the age of 60 get vaccinated, is not likely to be explained by their willingness to get vaccinated as a professional. It is more likely to be a choice for their personal health and to heed to the governments recommendation. Moreover, there could be an interaction between work experience and age, resulting in bias on their association vaccination status. Reasons nurses

stated to get or not get vaccinated are in line with other studies^{19-25,41}. Answers to open questions showed that a significant group of nurses continue to have misconceptions about influenza, such as vaccination provoking influenza, the vaccine having serious adverse effects or the vaccine being unsafe. These results are comparable to those of previous research⁴²⁻⁴³. These misperceptions could be caused by post-vaccination symptoms being wrongly interpreted as influenza symptoms⁴⁴.

Strengths and limitations

This study has several strengths. Firstly, this is the first ever research on this subject in a home care setting, giving an unique reflection of this group of nurses. Secondly, due to the questionnaire used, additional data from open questions gave some depth to motivations nurses gave. Another strength is the consistency of this study's findings compared to those of other studies regarding the same subject, suggesting minimal bias.

As a first limitation, we identified the current corona-crisis to be a possible influencing factor, although it is hard to say how this has influenced the data exactly. It is to be expected that the current attention to this infectious disease has had an impact on the way nurses think about the threat of infectious diseases. Some respondents stated it to be a reason why they might get vaccinated for influenza in the future.

Furthermore, some reservations have to be made whether this sample gives a good representation of the population. With analysis conducted on 449 questionnaires, this only accounts for 3 percent of the total population of 14500 nurses working at Buurtzorg²⁸. There could be a selection bias, while nurses with a more positive attitude towards influenza and its vaccination are more likely to participate in research about this subject, although this does not seem to be the case in the present study.

Another limitation of the outcomes is its low generalizability, since translation of the questionnaire and data analyses have proven the subject of influenza vaccination to be cultural sensitive and every country has slightly different recommendations in regards to vaccination. Moreover, Buurtzorg has a quite unique organizational structure with its' small self-directing teams²⁸, this might also reduce generalizability.

Lastly, although the questionnaire overall proved to be understandable and easy to fill out, it could have been a limitation that questions about reasons why to get or not get vaccinated were interpreted differently. Most of respondents interpreted them to be about seasonal influenza, but there were some nurses that interpreted it on vaccination in its entirety, mentioning vaccination

for hepatitis, children's diseases, travelers and possible Corona-vaccination in the future. So it can be concluded, that the way of questioning in section E possibly was a bit unclear.

Implications for clinical practice and future research

The results of this study have several implications for clinical practice. First, the association between knowledge levels and vaccination status indicates that progress can be made in education programs about this subject. This can ensure nurses to have sufficient knowledge to make well-informed decisions. Thereby, the misperceptions nurses have about influenza vaccination also argues for revision of education programs and motivational campaigns, with more emphasis on evidence based information about effectiveness and safety of vaccination. Finally, since nurses seem to have the highest priority for their own health, future campaigns may be more effective if they focus on nurses' personal benefits more than nurses' responsibility to protect clients. These implications can lead to a higher vaccination rate amongst home care nurses, and thus a safer health care system with less infections amongst nurses and patients, and a better continuity and quality of care.

Therewithal, some recommendations for future research can be made. Firstly, for the vaccination rate in several other HCW is higher than that of nurses, it might be valuable to conduct studies on the attitude of different HCW towards vaccination. Secondly, to get deeper insight into nurses' motives on the subject of influenza vaccination, qualitative research using in-depth interviews, is recommended for the future. Finally, future research about willingness of nurses to get vaccinated when vaccination is provided for free by the employer and easily obtained, could give insight into how much this will boost the vaccination rate. This could be a motivator for investment for health care organizations.

Conclusion

This research has demonstrated the low vaccination rate amongst Dutch home care nurses, representing a quite negative attitude towards influenza vaccination. This attitude is influenced by their age, work experience, knowledge level, perception of risk of influenza and intention to recommend vaccination to clients in the future.

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Tables and figures

Table 1. General task description of different levels nurses.

Level of education	General task description
Level 3	Low complex nursing, care and support
Level 4	Complex nursing care, coordination in patient-level
Level 5	High complex nursing care, quality of care and coaching on team-level

Figure 1. Flowchart of sample formation.

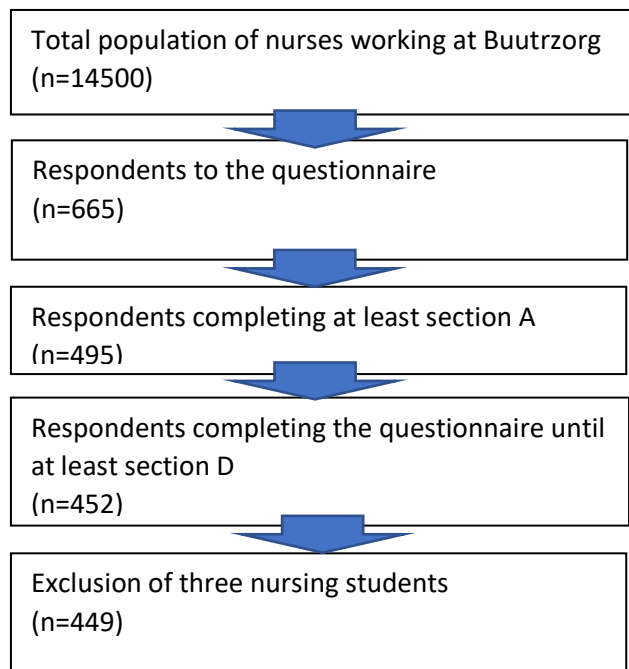


Table 2: Knowledge items with the lowest percentage of correct answers.

Seasonal influenza knowledge items (correct answer)	Answered correctly n(%)	H1N1 knowledge items (correct answer)	Answered correctly n(%)
Seasonal influenza vaccine may cause Guillain-barré Syndrome. (False)	82 (18,3)	H1N1 is spreading fast particularly among young people. (True)	126 (28,1)
Groups at highest risk of complications of seasonal influenza are: children younger than 2 years. (True)	158 (35,2)	Current seasonal influenza vaccines offer protection against H1N1 infection. (True)	126 (28,1)
Vaccinations give some people influenza. (False)	161 (35,9)	Most people have immunity to H1N1 virus. (False)	174 (38,8)
Vaccination may have serious adverse effects. (False)	188 (41,9)	H1N1 virus is not related to previous or current human seasonal influenza viruses. (True)	187 (41,6)
Which groups are recommended to have the annual seasonal influenza vaccination? Others with essential functions in society. (False)	189 (42,1)	H1N1 vaccines protect against the seasonal influenza. (False)	200 (44,5)

Tabel 3: Perception items with the lowest and highest mean scores

Lowest scoring items:	Mean score	Highest scoring items:	Mean score
I get sick more easily than other people of my age.	1,46 (strongly disagree)	If I had seasonal influenza, I would be on sick leave.	2,07 (disagree)
Without seasonal influenza vaccination, I am sure I will get the influenza this year.	1,44 (strongly disagree)	Influenza A (H1N1) can cause death.	1,87 (disagree)
Seasonal influenza never causes death.	1,42 (strongly disagree)	If I do not get H1N1 vaccination this year, I think I am very likely to get this influenza this year.	1,48 (strongly disagree)

Table 4. Health believe items most and least agreeing scores.

Items with the most agreeing scores	Mean score	Items with the least agreeing scores	Mean score
If I take care of myself, I can avoid illness.	2,47 (Moderately agree)	Whenever I don't feel well, I should consult a medically trained professional.	3,87 (slightly disagree)
I am in control of my health.	2,44 (Moderately agree)	No matter what I do, I'm likely to get sick.	4,98 (moderately disagree)
The main thing which affects my health is what I do myself.	2,40 (Moderately agree)	Health professionals control my health.	5,09 (moderately disagree)

Table 5. Main reasons to get or not get vaccinated

Reasons to get vaccinated (n=409)	n (%)	Reasons to not get vaccinated (n=410)	n (%)
Own health status	223 (20,6)	No need	387 (36,2)
To protect self	171 (15,8)	Concerns about vaccine's effectiveness/safety	206 (19,3)
To protect others	166 (15,4)	Fear of side-effects/getting ill	143 (13,4)
To protect clients	137 (12,7)	Personal choice/religion	113 (10,6)
Perception of vaccines effectiveness/safety	131 (12,1)	Not easily accessible	101 (9,4)
Perception of risk of epidemic/threatened	80 (7,4)	Prefer building own resistance	58 (5,4)
To avoid sick leave	71 (6,6)	Dislike of injection/pain	23 (2,1)
Recommendation/mandatory	56 (5,2)	Contraindications/dissuaded	21 (2,0)
Working in high risk areas	20 (1,9)	Lack of knowledge	18 (1,7)
Responsibility/example function of nurses	14 (1,3)		
Free/easily accessible	11 (1,0)		