



Influenza vaccine hesitancy and acceptance among healthcare workers: A qualitative study in Amsterdam, the Netherlands

Grippeimpfung: Skepsis und Akzeptanz bei Gesundheitsfachkräften. Eine qualitative Studie aus Amsterdam, Niederlande

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Abstract

Background/objective: Annual influenza vaccination is recommended for all healthcare workers because of their increased risk of nosocomial infections. Despite the recognized benefits, there is public concern about vaccination against many diseases, often termed vaccine hesitancy. As a result, influenza vaccination coverage in all European countries, including the Netherlands, is below the 75% recommended by the WHO and the European Union, which poses a threat to public health. With this in mind, this study aimed to gain insights into influenza vaccine uptake among healthcare workers of a university hospital in Amsterdam.

Methods: Eighteen semi-structured interviews were conducted with healthcare workers of the Amsterdam UMC with an average duration of 30 minutes. The transcripts were coded and analyzed based on the 5C vaccine hesitancy model.

Results: Half of the participants reported a low risk perception regarding influenza. Furthermore, non-pharmaceutical measures were more frequently mentioned than influenza vaccination, indicating that many do not see vaccination as essential. Although all participants were aware of occupational transmission and recognized the indirect protection vaccination provides for patients, they were less aware of asymptomatic transmission. Additionally, the limited availability of dates, timeslots and the need for appointments hindered participants' access to vaccination.

Conclusion: This study provides insights into the perceptions of influenza vaccination among healthcare workers, identifying key barriers and facilitators to uptake. To increase influenza vaccination coverage, hospitals can focus on improving information provision and reducing barriers to accessing vaccines.

Abstract

Hintergrund/Ziel: Eine jährliche Grippeimpfung wird für alle Gesundheitsfachpersonen empfohlen, da sie ein erhöhtes Risiko für nosokomiale Infektionen haben. Trotz des großen Nutzens ist die Impfskepsis in der Bevölkerung weit verbreitet. Infolgedessen liegt die Durchimpfungsrate für Influenza in allen europäischen Ländern, einschließlich der Niederlande, unter den von der WHO und der Europäischen Union empfohlenen 75 %, was eine Gefahr für die Volksgesundheit darstellt. Ziel dieser Studie war es, Erkenntnisse über die Inanspruchnahme der Grippeimpfung durch das Gesundheitsfachpersonal eines Universitätskrankenhauses in Amsterdam zu gewinnen.

Methoden: Es wurden achtzehn halbstrukturierte Interviews mit Gesundheitsfachpersonen des Amsterdamer Universitätsklinikums geführt, die durchschnittlich 30 Minuten dauerten. Die Transkripte wurden kodiert und auf der Grundlage des 5C-hesitancy Modells ausgewertet.

Ergebnisse: Die Hälfte der Teilnehmer gab an, ein geringes Risiko in Bezug auf die Grippe zu sehen. Darüber hinaus wurden nicht-pharmazeutische Maßnahmen häufiger genannt als die Impfung, was darauf hindeutet, dass viele eine Impfung nicht für notwendig halten. Obwohl sich alle Teilnehmer des Übertragungsrisikos am Arbeitsplatz bewusst waren und den indirekten Schutz für Patienten erkannten, waren sie sich der asymptomatischen Übertragung weniger bewusst. Darüber hinaus erschwerten die eingeschränkte Verfügbarkeit von Terminen, Zeitfenstern und die Notwendigkeit einer Terminvereinbarung den Zugang.

Schlussfolgerung: Diese Studie bietet Einblicke in die Wahrnehmung der Grippeimpfung bei Gesundheitsfachpersonen eines Spitals und zeigt die wichtigsten Hindernisse und Förderfaktoren für die Inanspruchnahme auf. Um die Durchimpfungsrate gegen Influenza zu erhöhen, wird empfohlen, dass sich die Krankenhäuser auf die Verbesserung der Informationsbereitstellung und den Abbau von Hindernissen für den Zugang zu Impfstoffen konzentrieren.

Keywords

Influenza – Vaccination – Vaccination coverage – Healthcare workers – Vaccine hesitancy – Vaccine acceptance – Qualitative research – In-depth interviews

Keywords

Influenza – Impfung – Durchimpfungsrate – Gesundheitspersonal – Impfmüdigkeit – Akzeptanz der Impfung – Qualitative Forschung – Tiefeninterviews



INTRODUCTION

Each year, seasonal influenza affects about 1 billion people, causing 3-5 million cases of severe illness and up to 650,000 deaths worldwide (World Health Organization, n.d.). The direct and indirect costs of seasonal influenza in the European Union are between €6 billion and €14 billion per year (Gianino et al., 2019; Preaud et al., 2014). Influenza is therefore of great public-health and economic interest (Fan et al., 2023; Szucs, 2004).

Annual influenza vaccination is the most effective way to protect against the serious effects of influenza, preventing approximately 40-60% of influenza cases (Centers for Disease Control and Prevention, 2024). Healthcare workers are up to 10 times more likely to contract influenza than the general population because of their increased workplace exposure risk (Fan et al., 2023; Kuster et al., 2011). Every winter, about 10-30% of healthcare workers are infected with influenza; about 50-80% continue to work while infected (Blanchet Zumofen et al., 2023; Looijmans-van den Akker et al., 2009). By continuing to work while infected, healthcare workers may infect others, including their colleagues and patients (Huttunen & Syrjänen, 2014). Another major problem is that 28-59% of influenza infections are subclinical, resulting in the undetected spread of the virus (Flegel, 2012; Pereira et al., 2017). Influenza in healthcare workers can lead to significant sickness-related absenteeism, making it difficult to manage schedules, particularly in a tight labor market (Antinolfi et al., 2020; Fan et al., 2023). Therefore, the World Health Organisation (WHO) recommends influenza vaccination for this particular group (World Health Organization, n.d.).

Vaccination is widely recognized as one of the greatest success stories of modern medicine (MacDonald et al., 2022). Despite its recognized benefits, there is public concern about vaccination (European Centre for Disease Prevention and Control, 2015; European Centre for Disease Prevention and Control, 2018; Osterholm et al., 2012; Schumacher et al., 2023; Treanor, 2016). This phenomenon has been termed “vaccine hesitancy,” which is defined by the WHO as “the delay in acceptance or refusal of safe vaccines despite availability of vaccination services” and recognized as 1 of the 10 greatest threats to global health. Several theories have been put forward to understand this phenomenon, including the widely used “5C” model, which describes five psychological antecedents of vaccine hesitancy: Confidence, Complacency, Constraints, Calculation and Collective Responsibility (Betsch et al., 2018).

In a background of increasing vaccine hesitancy, no European country has reached the target set by the Council of the European Union of 75% influenza vaccination coverage among healthcare workers (European Centre for Disease Prevention and Control, 2018). In the

Netherlands, influenza vaccination coverage among healthcare workers remains between 13% and 28%, despite several promotional campaigns (Schurink-Van 't Klooster et al., 2019; van Gageldonk-Lafeber et al., 2014). However, these figures are from 2012-2013, and more recent and reliable data are not available. Previous studies have identified several factors influencing vaccination among healthcare workers, such as time constraints (Kelly et al., 2008; Qureshi et al., 2004), perceived risks of the vaccine (Bonaccorsi et al., 2013; Wicker et al., 2009), not receiving a prescription for the vaccine (Raftopoulos, 2008; Rubin et al., 2011) or concerns about the safety and efficacy of the vaccine (Barrière et al., 2010; Maconachie & Lewendon, 2004). Recently, little qualitative research has examined reasons for low vaccination rates, particularly in the post-COVID-19 era. Therefore, this study aims to gain insights into the factors influencing influenza vaccine uptake among healthcare workers at a university hospital in Amsterdam, with the aim of informing efforts to improve vaccination coverage through targeted strategies.

METHODS AND SETTING

Study design and framework

This qualitative study drew on the 5C model of vaccine hesitancy, a widely used theoretical framework consisting of five domains. Confidence is described as “trust in (i) the effectiveness and safety of vaccines; (ii) the system that delivers them, including the reliability and competence of the health services and health professionals; and (iii) the motivations of policy-makers who decide on the needed vaccines” (MacDonald & SAGE Working Group on Vaccine Hesitancy, 2015). Complacency “exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action” (MacDonald & SAGE Working Group on Vaccine Hesitancy, 2015). Constraints are a problem when “physical availability, affordability and willingness-to-pay, geographical accessibility, ability to understand (language and health literacy) and appeal of immunization services affect uptake” (MacDonald & SAGE Working Group on Vaccine Hesitancy, 2015). Calculation is described as the “individuals’ engagement in extensive information searching” (Betsch et al., 2018). Collective responsibility is “the willingness to protect others by one’s vaccination by means of herd immunity” (Betsch et al., 2018).

Setting

Interviews were conducted with healthcare workers of the Amsterdam UMC, an academic medical center with over 19,500 employees. Annual influenza vaccination



campaigns are conducted to promote vaccine uptake. The study focused on several departments with clients at particular risk of influenza-related morbidity and mortality. Eleven departments were approached to participate in the study, of which four agreed to participate: cardiology, nephrology, geriatrics and pediatrics. The remaining departments did not respond to the invitation.

Sampling and recruitment

Healthcare workers were defined according to the Dutch National Institute for Public Health and Environment (RIVM)'s target definition, which is "healthcare workers aged 18 and over who have direct contact with clients, including trainees, apprentices, agency workers and freelancers" (Rijksinstituut voor Volksgezondheid en Milieu, 2021). Purposive sampling through heads of departments was used to ensure the participation of healthcare workers from different backgrounds, and to build trust and encourage participation.

Data collection tool

The interview guide was designed using both the European Centre for Disease Prevention and Control's guide for vaccine hesitancy among healthcare workers and the 5C vaccine hesitancy model (Betsch et al., 2018; European Centre for Disease Prevention and Control, 2015). A comparison was also made with the hepatitis B vaccine, which is mandatory for healthcare workers at risk of exposure to the virus (Rijksinstituut voor Volksgezondheid en Milieu, 2013). This comparison provided insights into the role of mandatory vaccination in this context. In addition, the interview guide was piloted with two healthcare workers, after which minor changes were made. The interview guide can be found in [Appendix 1](#).

Data collection

Semi-structured interviews were conducted to explore healthcare workers' experiences and perspectives on influenza vaccination. The interviews were conducted by a Master's student in health sciences trained in qualitative research. They had to be kept relatively short, lasting approximately 30 minutes because healthcare workers are busy and their time is limited. The interviews were conducted either online or in person, depending on the participant's preference. All interviews were conducted in Dutch.

Data Analysis

The interviews were recorded and transcribed verbatim, and the transcripts were coded using ATLAS.ti software,

which allowed for a systematic analysis of the data. The interviews were mostly deductively coded, based on the five main domains of the 5C vaccine hesitancy model and their subcategories. In addition, there was an inductive element, with new codes added to capture emerging themes. For their inclusion in the results section, excerpts of the interviews were translated into English by the first author, who is a native Dutch speaker with advanced English-language proficiency.

Data quality

A number of measures were taken to ensure the validity and reliability of the study. First, to ensure that the questions were relevant to the purpose of the study and that the same codes were applied consistently, the interview guide and codebook were reviewed by two secondary researchers with experience in the field. This also increased credibility and reduced potential bias. In addition, to avoid further potential bias and capture a broad perspective of both vaccinated and unvaccinated healthcare workers, a neutral approach was employed. Vaccination status was not asked prior to the interview, and emphasis was placed on gaining insights into the overall vaccination policy at the Amsterdam UMC.

Ethical considerations

This research is not subject to the Medical Research Involving Human Subjects Act (WMO). A BETCHIE self-test was conducted to determine if ethical clearance was necessary. The secretariat of the METC Amsterdam UMC was also consulted. Based on the results, ethical approval was not required for this research. Participants were asked to sign an informed consent form prior to their interview. In addition, permission was sought to record and transcribe the meeting.

RESULTS

In total, 18 (67% female) healthcare workers, with an average age of 41 years, were interviewed. Twelve participants (67%) reported receiving the influenza vaccine during the most recent influenza season in 2023-2024. Half were nurses (50%); just over one in five were physicians (22%); another 22% were medical residents and student assistants; and there was one technician (6%). An overview of the participants' sociodemographic information can be found in Table 1. Individual characteristics could not be presented for reasons of anonymity.



Table 1: Sociodemographic characteristics of participants

	Total (n=18)	Percentage
Sex		
Female	12	67%
Male	6	37%
Age		
< 25	4	22%
26-35	2	11%
36-45	4	22%
46-55	3	17%
>56	5	28%
Professional background		
Nurses	9	50%
Physician	4	22%
Medical resident	2	11%
Student assistants	2	11%
Auxiliary staff	1	6%
Department		
Cardiology	8	44%
Nephrology	4	22%
Geriatrics	3	17%
Paediatrics	1	6%
N.A.	2	11%
Vaccination status		
Vaccinated	12	67%
Not vaccinated	6	33%

Influenza vaccination practices and attitudes

Influenza vaccination at the Amsterdam UMC is a yearly occurrence offered to staff. For this reason, those who have been working at the hospital for several years are more likely to be familiar with these services. They have had multiple opportunities to be vaccinated, and the extent to which they have taken advantage of this varies between regular, occasional, and not at all. This may be more complicated for newly qualified healthcare workers because they have had less exposure to these services. Of the 12 vaccinated participants, five had used ad-hoc services in the past year, five had been vaccinated by peers in the department, and two had been vaccinated by their general practitioner due to underlying health problems. The results of the interviews are presented following the domains of the 5C vaccine hesitancy model.

Reasons for vaccination

Twelve participants had received the influenza vaccine in the previous year. The primary reasons for receiving the vaccine were to reduce their own risk and to reduce the risk to patients. These were followed in priority by lowering the risk to those around them, and the belief that their employer expected vaccination.

Reasons not to get vaccinated

Among the six participants who did not receive the influenza vaccine in the past year, the primary reason cited was the belief that they had strong immunity. Other reasons included not receiving an invitation, not having enough time, or simply forgetting. Less-frequently-cited reasons were a fear of needles and of getting sick from the vaccination.

Intention to get vaccinated during the next influenza season

Sixteen participants expressed that they would be willing to be vaccinated next influenza season. Meanwhile, the other two participants said they would decline the offer. Of these, one participant was vaccinated and did not intend to take the vaccine again due to having experienced a severe side effect. The other participant was not vaccinated and did not believe the vaccine to be necessary.

Confidence

Trust in the effectiveness, safety, and system

The majority of participants expressed confidence in the overall effectiveness of influenza vaccines, particularly for certain groups, such as older adults and people with underlying health issues. However, respondents mentioned that it may be difficult to prove causality and that effectiveness can vary annually because it relies on predictions.

“You might not notice [influenza vaccines’] effectiveness because you just do not get [influenza], but I think it is effective. I think it does not protect against all strains of influenza, so you may still get sick.”– Nurse, female (age 26-35), vaccinated.

These participants had generally positive views about the safety of the influenza vaccine, especially in light of the stringent laws and regulations that apply to vaccine development within the EU and the Netherlands, as well as the long history of the influenza vaccine within the healthcare system. They also had confidence in the institutions responsible for providing information and administering the influenza vaccine, including the Amsterdam UMC. Only one participant mentioned occasional doubts about the effectiveness and safety of the vaccines, and sometimes questioned whether the Amsterdam UMC had the best interests of the healthcare workers at heart.



Complacency

Perceived risk of acquiring influenza

There were different perceptions of the risks that influenza can pose. In all cases, participants agreed that there could be (serious) risks for older people and patients. However, half of the participants believed that these risks did not necessarily apply to them. They described how if you are healthy and young, you are less likely to get sick with influenza, and if you do get sick, you will be able to cope with the disease.

“I do not think the risks for myself are very high, since I am reasonably healthy. However, for the patients in the hospital, the elderly in nursing homes, or anyone with an illness, it can be very serious.” – Nurse, female (age 26-35), vaccinated

Vaccination is not considered essential for prevention

When asked about the measures they take to protect themselves and their patients from influenza, all participants mentioned non-pharmaceutical prevention strategies, such as wearing a face mask, keeping a distance from others when possible, and having a healthy lifestyle. However, they reported that they mainly consider using these preventive measures when either they or their patients show respiratory symptoms. Only a minority mentioned vaccination.

“Well, I always disinfect my hands properly. If I have a bit of a cough, I wear a face mask. The rules regarding wearing face masks tend to fluctuate somewhat in the hospital so it can be confusing. It also depends on the person. Personally, I notice that I wear a face mask if I have a cough or if someone else has a cough or a runny nose.” – Student assistant, female (age ≤25), vaccinated

Perspectives on mandatory vaccination

Almost all participants were strongly opposed to mandatory influenza vaccination for healthcare workers, citing concerns about personal autonomy. In contrast, when asked about their views on the mandatory hepatitis B vaccination, they expressed a different perspective, accepting the vaccine requirement due to the severity of the disease, the lack of a cure, and the hepatitis B vaccine's long-lasting protection.

“Yes, but [Hepatitis B vaccination] is another thing – then you are protected for years, if not for the rest

of your life if the titer stays good. I got it because it was mandatory, and because it was in the best interest of myself as well. However, now I am contradicting myself, because the influenza vaccination is also for your own benefit. No, that is a very good one, you are making me think.” – Auxiliary staff, female (age 46-55), non-vaccinated

Constraints

Accessibility

Most healthcare workers reported that it was relatively easy for them to get the influenza vaccine. However, they did experience some constraints related to the method of administration. There was praise for the option to get vaccinated directly in the ward through peer vaccination. However, this opportunity is not available to all departments and may vary from year to year. In addition, there was a reported lack of flexibility related to these ad hoc services.

“I often found it difficult to schedule appointments because you always have your pager on you, and it can be quite busy. As a result, I frequently had to reschedule the appointments because I could not make it to the first one, and you do not go to the hospital separately when you have a day off.” – Physician, male (age 36-45), vaccinated

Several participants also mentioned that there are often limited dates, time slots and opportunities for vaccination. These restrictions made it difficult to obtain the vaccine, as influenza vaccination is only offered for a limited period each year.

The vaccination itself went smoothly. However, it was a bit challenging to schedule an appointment due to limited availability. There is definitely for improvement in terms of scheduling, as the available time slots are between, let's say, 8 a.m. and 5 p.m., and people are working then. [...] As far as I can remember, there were only two days available for appointments, and I barely managed to secure one of the last spots.” – Medical resident, female (age ≤25), vaccinated

Communication

Last, two participants described receiving limited communication regarding the influenza vaccination; they had not taken up the vaccination opportunity because they had not received official invitations. However, they hypothesized that this was due to their employment status, with one being a freelancer and the other a flex worker.



“Look, you know, if you were sitting here with a syringe, I would have done it [...]. I did not know you had to [...]. So yeah, if I knew a round had started or something I would have done it, I think.” – Student assistant, male (age ≤25), non-vaccinated

Calculation

Information provision

Most participants expressed initial satisfaction with the information and advice offered by the Amsterdam UMC. They had not engaged in extensive information searches during the past influenza season, which reflects this trust. They assumed that the hospital’s information was derived from reputable scientific sources, such as RIVM or PubMed, from which they also would obtain their information. However, some had sought additional vaccination information in previous years. Two of them highlighted the potential impact of extensive searches on decision-making, with one citing the risk of encountering misinformation.

“I sometimes get links forwarded from Google searches. If you read what they say about unreliability, the WHO and what went wrong, then of course sometimes you just find contradictory information. If you search a lot, you get more and more of that kind of information through these algorithms. Yes, and at some point, it really is a choice for me. When you really start to distrust the RIVM and the government – I think that is what happens to a lot of people. What do you have to hold on to then?” – Nurse, male (age > 56), vaccinated.

In this regard, one participant emphasized the importance of acknowledging potential doubts about vaccination among employees, and highlighted the responsibility of the Amsterdam UMC to effectively address these concerns.

“I do not remember which year that was when there was suddenly such a smear campaign against the influenza vaccination that the AMC jumped on it. I remember very well that they also explained the investigations at that time, because yes, the people who work here are not crazy. If you dismiss their doubts as nonsense, I do not think that is very helpful.” – Physician, female (age > 56), vaccinated.

As the interviews progressed, almost all participants expressed a greater need for more detailed science-based information using clinical lessons and infographics. For instance, they were surprised to learn about the current vaccination rate among healthcare workers, and expressed a desire to be informed about such statistics.

Incentives

Incentives, such as providing a Dutch snack (a “croquette”) for staff who are vaccinated against influenza, as part of a “Croquette for a Jab” campaign that the hospital had run in previous years, also motivated participants to get vaccinated. However, some participants suggested that a healthier and perhaps vegetarian option would be a better alternative.

“Many nurses seem to be more sensitive to that, to a croquette sandwich. Well, I am a vegetarian, so I find the whole croquette sandwich a bit of a joke. But I know that in general, that works very well from time to time, so they handled that well.” – Nurse, female (age 36-45), non-vaccinated

Collective responsibility

Awareness of indirect protection

All participants were aware that vaccination not only protects themselves but also indirectly protects their patients against morbidity and mortality, as illustrated by the following comment:

“You try to do the maximum to protect vulnerable people. What is the alternative? To do nothing. That still carries its risks. At the moment, you are hoping to minimize those risks as much as possible. So even though I am not vulnerable myself – so, indirectly, because I am not vulnerable myself, you still hope to protect a vulnerable group.” – Nurse, female (age 46-55), vaccinated.

Willingness to protect others

One unvaccinated participant also stated that a sense of collective responsibility would be the only reason to get vaccinated in the future.

“At that time, they [the hospital] did emphasize that we should do this for the patients. Well, I am sensitive to that. So that was the only intrinsic part, that I thought, ‘Okay, I would do it for them.’” – Nurse, female (age 36-45), non-vaccinated

Although everyone acknowledged that healthcare workers could transmit the virus to vulnerable groups, one participant emphasized that the responsibility for health lies with society as a whole, and is not solely the duty of a healthcare worker.



DISCUSSION

In the past two decades, multiple efforts have been made to increase influenza vaccination coverage among healthcare workers in hospitals. However, the current vaccination coverage remains below the established target of 75% set by the WHO, the European Union, and the National Public Health Authorities. Therefore, this research aimed to gain insights into influenza vaccine uptake among healthcare workers at the Amsterdam UMC.

Interpretation of the main findings

One of the main findings from this study was that half of the participants did not consider themselves at risk of contracting influenza, or believed that their immune system could manage the consequences, indicating a higher level of Complacency (Betsch et al., 2018). This is consistent with the literature, which highlights how influenza vaccine hesitancy among healthcare workers is often related to low perceived susceptibility (Dini et al., 2017; Guillari et al., 2021; Mannocci et al., 2010; Schmid et al., 2017). In addition, non-pharmaceutical measures to prevent influenza were cited more often than vaccination, suggesting that vaccination is not seen as an essential preventive measure (Galagali et al., 2022).

In line with the domain of Collective responsibility, all participants recognized the potential for occupational transmission and acknowledged that vaccination could indirectly protect patients (Betsch et al., 2018). Thus, the problem seems to be a belief that if they do not get sick, they cannot transmit the virus either — leading them, once again, to not prioritize vaccination. However, 28–59% of influenza infections are subclinical, contributing substantially to the unintentional spread of the virus (Flegel, 2012; Guillari et al., 2021; Pereira et al., 2017). Therefore, actions based on symptoms — “if I get sick, I will stay home” or “if I experience symptoms, I will use non-pharmaceutical preventative measures” — are less likely to prevent onward transmission.

These findings indicate that there are misconceptions and limited understanding of the problem, which is consistent with other research (Mannocci et al., 2010). As a result, healthcare workers may unintentionally infect their patients, despite their intention to protect them, due to a lack of awareness of the risks and transmission of influenza. Education could play a significant role in addressing this gap because most of the participants pointed to a lack of evidence in current information provision and expressed a need for more comprehensive figures.

In addition, the participants showed low levels of Calculation, as they did not search for additional information from sources other than the Amsterdam UMC (Betsch et al., 2018). Nonetheless, they highly valued the provision of information, as it influenced their

decision-making every year. If healthcare workers are not well-informed on the topic, or if they are suspicious, they are more likely to engage in additional research, such as conducting online searches. However, it may be easier to stumble across misinformation, which is often driven by emotional or conspiracy-driven narratives (Brainard & Hunter, 2020). Consequently, it is important to address misconceptions in order to mitigate the search for, spread of, and susceptibility to misinformation (Lewandowsky et al., 2012).

Furthermore, the participants demonstrated high levels of Confidence in the Amsterdam UMC, the organization responsible for administering the vaccines and providing them with information (Betsch et al., 2018). This suggests that regularly updated and accurate information could increase healthcare workers' acceptance (Jiang et al., 2023; Souza et al., 2022). Providing healthcare workers with the right information could potentially increase their willingness to accept the vaccine.

However, even when healthcare workers have the necessary knowledge, coverage remains low if vaccination services are inaccessible or unknown. To improve vaccination coverage, vaccination should be made as convenient as possible by solving the current Constraints, which exist mainly around the ad hoc services (Betsch et al., 2018). Limited availability of dates and time slots, and the need for appointments in the first place, currently hamper efficient access to vaccinations. This is in spite of efforts by the hospital to reduce accessibility barriers. In addition, unlike the hepatitis B and COVID-19 vaccines, which may only require a booster dose, influenza vaccination is not a one-time event and must be repeated annually. Therefore, the constraints seem to recur each year. This, combined with the consistently high workload, can make it difficult to provide easy access to vaccination.

These findings are consistent with previous studies addressing the lack of availability of influenza vaccination services (Jessop et al., 2017; Lewthwaite et al., 2014). On a positive note, participants who had received vaccination in the ward from peers expressed a more favorable experience, suggesting that expanding this service to every ward could potentially increase vaccination coverage.

Lastly, some participants reported not receiving an invitation, which discouraged vaccination. Effective communication is crucial to raise awareness and to encourage healthcare workers, whether permanent or temporary, to get vaccinated (European Centre for Disease Prevention and Control, 2019). This is particularly important because the number of self-employed within the health and welfare sector is increasing each year and falls within the target group of the National Institute for Public Health and Environment (RIVM) (Rijksinstituut voor Volksgezondheid en Milieu, 2021).



Strengths and limitations

Through qualitative methods, we were able to examine in-depth factors associated with influenza vaccine hesitancy and acceptance among healthcare workers. The respondents include healthcare workers of various ages and functions. One limitation was that two-thirds of respondents had received the influenza vaccination in the past year, which is more than double the 29% vaccination rate observed in 2022 in the Amsterdam UMC (Maas, J, 2022). As a result, negative perspectives on influenza vaccination may be underrepresented. However, because of the annual nature of influenza vaccination, vaccination status varies over time, and current vaccination status does not always indicate complete acceptance or refusal of the vaccine. Additionally, because the influenza vaccination campaign was conducted in the autumn of 2023 — around six months before data collection — some respondents experienced challenges in recalling their experiences. Lastly, only four out of the 11 invited departments at the Amsterdam UMC participated in this study. Therefore, the findings of this study may not be representative at the hospital level.

Implications and recommendations

Previous research has demonstrated that multifaceted campaigns are most effective in increasing vaccination coverage (Hollmeyer et al., 2013; Schumacher et al., 2023). Using multiple interventions, a campaign is more likely to have an impact on several domains of the 5C hesitancy model. Although each domain influences vaccination behavior directly, the findings of this study illustrate their inter-relationships. For healthcare workers, complacency fosters a particular type of collective responsibility that underestimates the risk of transmission. This perception is exacerbated by a lack of awareness of asymptomatic transmission. Complacency also leads to lower levels of calculation, reducing interest in the benefits of vaccination and limiting information-seeking. Taking this interrelatedness into account is likely key to the (sustained) impact of strategies to increase vaccine uptake.

This study also revealed that it is important that healthcare workers choose influenza vaccination from intrinsic motivation rather than out of a sense of coercion. The hospital has undertaken various efforts to increase influenza vaccination coverage, including incentives (such as the croquette), increasing ease of access, and highlighting role models for vaccinations. Although the campaign involving the croquette was mentioned, other methods were not identified by respondents. The findings of this study indicate that there are two main areas in which efforts should be focused to increase vaccination

coverage among healthcare workers at Amsterdam UMC. These two organizational strategies are expected to eliminate practical barriers and strengthen healthcare workers' intrinsic motivation to receive the vaccine annually.

1. More and tailored information.

To provide more comprehensive and tailored information, it would be beneficial to conduct clinical lessons given by infectious disease and vaccination experts, and to expand information letters about vaccination with more facts and figures. One of the key issues to address is subclinical transmission because many participants are unaware of this phenomenon. Using more infographics could help draw attention to it. In addition, promotion through flyers, posters, banners and e-mail should start earlier in the process. All of these materials could include QR codes for quick and easy registration.

2. Facilitating access.

Multiple reminders could also aid in raising more awareness, as e-mails are often overlooked. Furthermore, ad hoc services should be expanded. Offering more dates and extended opening hours could increase vaccination rates, along with walk-ins instead of fixed appointments. Healthcare workers could also be actively invited to get vaccinated — for example, at the entrance and exit of the hospital. Peer or on-site vaccination could be offered in every department to make the process easier for healthcare workers.

Future research

In future research, it may be useful to have an adaptation of the 5C hesitancy model specifically for influenza. Compared to vaccination for other diseases, influenza vaccination poses unique challenges, particularly due to influenza's annual recurrence. As a result, health workers are constantly making calculations and weighing benefits and risks. The domain of calculation should therefore play a more central role within a framework in which the other domains influence calculation (Lam et al., 2010). Also, influenza vaccination campaigns often consist of several components, making it difficult to assess the key intervention and its impact. Therefore, to optimize future campaign strategies, there is a need to evaluate the impact of specific interventions through clustered, randomized trials or case-control studies.

CONCLUSION

This study provides insights into the perceptions of influenza vaccination among healthcare workers at



the Amsterdam UMC and the potential strategies to increase vaccination uptake among healthcare workers in Amsterdam and other settings. Although healthcare workers intend to protect their patients, they often underestimate the risk of contracting the virus themselves and the potential for subclinical transmission. As a result, they sometimes do not consider vaccination for influenza essential. The most important facilitators of influenza vaccination uptake are risk awareness, self-protection, and willingness to protect others. The main barriers to vaccination were the low perceived risk of acquiring influenza, inadequate vaccination services and misconceptions. To increase influenza vaccination

coverage, it is recommended that hospitals focus on improving information provision and reducing barriers to accessing vaccines.

Ethical considerations

This research is not subject to the Medical Research Involving Human Subjects Act (WMO).

Conflict of interest statement

None of the authors have any conflicts of interest to disclose concerning this study.

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