

## VACCINATION AGAINST INFLUENZA: ATTITUDE OF HEALTH CARE PERSONNEL IN A MULTIDISCIPLINARY HOSPITAL IN LATVIA

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*Health care personnel (HCP) are at high risk of acquiring influenza due to exposure to patients. However, vaccination in HCP is lower than 40% for most European countries. The aim of this study was to determine the attitude towards influenza vaccination and possible reasons for this attitude in HCP. A cross-sectional study was performed in a multidisciplinary hospital of Latvia. The sample (n = 1099) included doctors (239), nurses (418), care services (236), administrative staff (108), and technical support staff (98). Five questions addressed vaccination of planned patients and HCP, knowledge of etiological anti-influenza drugs, and their storage at the hospital for immediate use. The results revealed that the level of regular vaccination against influenza in HCP was relatively low (14%). This contrasted with a more positive attitude towards vaccination of patients (53%) and personnel (60%). This contrast provided evidence for a low level of proactive action. High expectations regarding medications covered by the hospital (82%) indicated transferring of part of personal responsibility to the organisation. Doctors demonstrated a better understanding of the problem and a higher level of vaccination. However, some of doctors' attitudes showed underestimation of influenza-associated risk.*

**Key words:** *influenza, vaccination, attitude, primary control, secondary control.*

Influenza is among the most common highly contagious infectious diseases, which results in the death of hundreds of thousands of people annually (Palache *et al.*, 2015). Defined as any person working in a health care setting (Pearson *et al.*, 2006; Shefer *et al.*, 2011), health care personnel (HCP) are at high risk of acquiring influenza virus infection due to exposure to the patients, infectious materials, or contaminated air. At the same time, unvaccinated HCP might be the source of infection for patients and contribute to nosocomial influenza outbreaks in health care settings. These outbreaks lead to increased patient morbidity and mortality, HCP illness and absenteeism, and economic costs to the health care system (Stewart and Cox, 2013).

Vaccination is the most effective way to prevent this infection. The World Health Organisation recommends that 75% of the HCP should be vaccinated against influenza. However, vaccination in the HCP group is lower than 40% for most European countries (Jorgensen *et al.*, 2018), and the decline in influenza vaccination coverage among HCP is an international problem (Hulo *et al.*, 2017). The common reasons for the low vaccination rate include fear of side-effects, inadequate knowledge about influenza and vaccination, lack of perceived risk of influenza infection, concerns over vaccine safety and effectiveness, lack of free time for vaccination, and unavailability or high costs of vaccine (Cozza *et al.*, 2015; To *et al.*, 2016; Hulo *et al.*, 2017;

James *et al.*, 2017). An important factor for vaccine hesitancy in Europe is also a reported mismatch between circulating and vaccine strains (Cozza *et al.*, 2015; Hulo *et al.*, 2017). Being vaccinated relates positively to a higher knowledge score based on epidemiological influenza items (Hulo *et al.*, 2017).

Based on data of the Disease Prevention and Control Centre of Latvia, about 240 people in Latvia died because of influenza complications in the last three years (Anonymous, 2018). The average age of these patients was 60–70 years. Despite regular information provided to the public, no more than 2.5% of the population of Latvia are vaccinated against influenza every year (Anonymous, 2018). The state compensates 50% costs of the vaccine for pregnant women, elderly individuals (aged more than 65 years), and individuals with chronic medical conditions, while children 6–24 months and particular health groups of children and adolescents 24 months–18 years have 100% compensation. In the 2017/2018 season, 23 534 people used state compensated vaccines (Anonymous, 2018).

The Disease Prevention and Control Centre of Latvia recommends vaccination against influenza for all HCP, but it is not mandatory. The aim of this study was to determine the attitude towards influenza vaccination and possible reasons for this attitude in HCP of a multidisciplinary hospital of Latvia.

From a psychological perspective, attitudes towards and decisions regarding vaccination involve the use of self-regulatory control strategies (Heckhausen *et al.*, 2010). Primary control means changing the situation through direct action (e.g., vaccination). Secondary control includes a change in individual expectations regarding possible outcomes (e.g., lowering the perceived probability of a disease). Therefore, primary control associates with proactive acting before the possible problem, while secondary control facilitates reactive acting after the problem occurs. In addition to primary and secondary modes of control, selective and compensatory control presents individual use of personal and external resources, respectively. In the case of vaccination, the involvement of external resources means sharing responsibility for personal health with others (e.g., health care organisation).

The study was approved by the Ethics Committee of Rīga Stradiņš University. A cross-sectional study started in November 2016 and finished in March 2017. This study period included the epidemic influenza season of 2016–2017 in Latvia (Anonymous, 2017). The survey was conducted in a multidisciplinary hospital of Latvia with staff of more than 4380. The participation was voluntary and anonymous. About 1300 respondents answered the questions, and 1099 answers were valid. The participants were doctors (239), nurses (418), care services (236), as well as administrative staff (108), and technical support staff (98).

The following questions were posed:

1. Do you support that planned patients who are being admitted to treatment during an influenza epidemic should be vaccinated against influenza?

2. Do you support that health care personnel should be vaccinated against influenza because they represent a risk group?

3. Have you been vaccinated against influenza every season?

If you checked “No”, please answer two additional questions:

Would you be willing to be vaccinated against influenza?

a. if the vaccine would be available with a 50% discount?

b. if the vaccine would be free of charge (100% discount)?

4. Do you know any etiological influenza medications and how to take them when you start getting sick?

5. In your opinion would it be useful to have reserves of influenza medications in the hospital in case you become ill at the workplace, as then you could start to take medications immediately (at the expense of the hospital) and further continuing to take them at your own expense?

Statistical analysis of the answers was performed by IBM SPSS Statistics 22.0 for Windows. The chi-square test was applied for a comparison of the level of agreement or disagreement to a particular question. McNemar’s chi-square test for related samples was used for a paired comparison of answers to different questions.

Table 1 presents the proportions of positive answers to the questions regarding different aspects of vaccination. A comparison of answers in the sample demonstrated that a positive attitude towards vaccination of medical personnel at risk (60%) was higher than the positive attitude towards vaccination of planned patients (53%), McNemar’s  $\chi^2(1) = 18.22$ ,  $p < 0.001$ . However, the percentage of regularly vaccinated HCP (14%) was about four times lower (Fig. 1) than the assessed need for vaccination of patients (53%), McNemar’s  $\chi^2(1) = 377.13$ ,  $p < 0.001$ , and HCP at risk (60%), McNemar’s  $\chi^2(1) = 483.56$ ,  $p < 0.001$ . Doctors had relatively higher regular vaccinations (27%),  $\chi^2(1) = 44.91$ ,  $p < 0.001$ , and positive attitude towards vaccination of the personnel at risk (70% of agreement),  $\chi^2(1) = 12.54$ ,  $p < 0.001$ , than other groups of HCP. The doctors’ attitude towards vaccination of planned patients was similar to that of other groups,  $\chi^2(1) = 2.70$ ,  $p = 0.101$ .

Not-vaccinated HCP had a relatively negative attitude towards vaccination with 50% cost discount (15% of agreement),  $\chi^2(1) = 410.16$ ,  $p < 0.001$ , while their attitude towards vaccination for free (48% of agreement) did not significantly differ from the 50% compensation,  $\chi^2(1) = 2.49$ ,  $p = 0.114$ .

Table 1

ABSOLUTE FREQUENCY AND PERCENTAGE OF A POSITIVE ATTITUDE TOWARDS ASPECTS OF VACCINATION IN FIVE SUBSAMPLES AND IN THE TOTAL SAMPLE (n = 1099)

Question	AD (n = 108) f (%)	CS (n = 236) f (%)	D (n = 239) f (%)	N (n = 418) f (%)	TS (n = 98) f (%)	Total sample f (%)
1. Vaccination of planned patients	41 (38%)	127 (54%)	138 (58%)	234 (56%)	45 (45%)	585 (53%)
2. Vaccination of medical personnel	64 (59%)	140 (59%)	167 (70%)	227 (54%)	58 (59%)	656 (60%)
3. Regular personal vaccination	3 (3%)	22 (9%)	65 (27%)	54 (13%)	10 (10%)	154 (14%)
3a. Vaccination (50% discount)	10/91 (11%)	23/179 (13%)	35/161 (22%)	43/318 (14%)	10/80 (13%)	121/829 (15%)
3b. Vaccination (100% discount)	46/104 (44%)	113/221(51%)	93/186 (50%)	166/369 (45%)	44/91 (48%)	462/971 (48%)
4. Knowledge of etiological drugs	60 (56%)	149 (63%)	222 (93%)	350 (84%)	36 (37%)	817 (74%)
5. Storage of covered drugs	82 (76%)	183 (78%)	199 (83%)	357 (85%)	81 (83%)	902 (82%)

AD, Administrative staff; CS, Care services; D, Doctors; N, Nurses; TS, Technical support personnel; f, absolute frequency of positive answers. Answers to Questions 3a and 3b show the frequency of positive attitude and the number of answers (f/n) because the questions were not obligatory for vaccinated employees and were omitted by some participants.

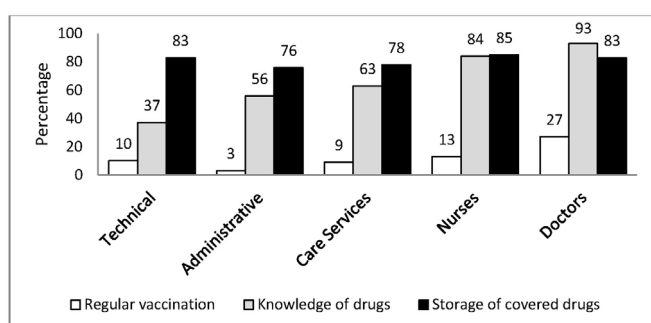


Fig. 1. Percentage of regular vaccination of personnel and attitude towards etiological drugs.

The most positive attitude was towards storing anti-influenza medication, the cost of which would be covered by the hospital (82% of agreement),  $\chi^2(1) = 449.69$ ,  $p < 0.001$ . In addition, the total sample demonstrated relatively high knowledge (74% of agreement) on etiological anti-influenza drugs,  $\chi^2(1) = 254.63$ ,  $p < 0.001$ . Doctors had better knowledge on etiological drugs (93%),  $\chi^2(1) = 53.84$ ,  $p < 0.001$ , and had similar attitudes as other groups in the attitude towards employer covered drugs,  $\chi^2(1) = 0.15$ ,  $p = 0.695$ .

In general, the level of vaccinated HCP was relatively low (14%) and remained much lower than 75%, the rate recommended by WHO. For comparison, similar levels of vaccinated HCP were described in hospitals in Italy (Cozza *et al.*, 2015), Croatia, Switzerland, and Serbia (Jorgensen *et al.*, 2018). In contrast, the highest level of vaccination was under the mandatory vaccination policy in the United States (up to 96%) (Black *et al.*, 2015), Belarus (95%), Albania (90%), and Armenia (100%) (Jorgensen *et al.*, 2018).

Doctors demonstrated a better understanding of the danger of infection spread and were vaccinated more often than other groups of HCP. This concurs with other studies on vaccination of HCP (Hulo *et al.*, 2017; Hagemester *et al.*, 2018). However, about one-third of doctors in our study did not consider that the risk group should be vaccinated, and about two-fifths of doctors did not expect vaccination of planned patients.

The comparisons of attitudes revealed significant differences in the assessment of the need for vaccination for patients and HCP and actual behavior regarding regular vaccination. The results demonstrated a gap between the general attitude towards the usefulness of vaccination and risk-prevention behavior. Possible explanations of the differences include lowering the personal risk of disease and relatively high reliance on aetiological medication in the case of influenza. In accordance with views of self-regulatory control (Heckhausen *et al.*, 2010), changing expectations regarding disease (secondary control) seems to be a more powerful regulatory strategy in HCP than personal vaccination (primary control). In addition to differences in primary and secondary control, the preference for compensatory control is apparent as the difference between the level of vaccination (14%), based on personal resources including time, effort, and finances, and the level of expected support from the hospital in the case of infection (82%). It can also show a misbalance in taking personal responsibility and transferring it to the hospital (employer).

The percentage of vaccinated HCP in the hospital was higher than in the population of Latvia. At the level of the population, it amounted to 1.10% in 2016–2017 (Anonymous, 2017) and 2.24% in 2017–2018 (Anonymous, 2018). Despite a relatively higher level of vaccination in HCP, prophylaxis of nosocomial outbreak in hospitals should be developed in Latvia. Solving the problem by discounting vaccination costs remains in question. In the case of a possible 50% discount, the general attitude remained relatively negative, while an imagined 100% discount increased the rate of positive answers no more than to the fifty-fifty level.

Another solution is balancing relatively high expectations regarding the hospital and personal responsibility for vaccination. On the one hand, personal responsibility should be clearly stated. For example, mandatory vaccination for HCP can be considered, as it has been discussed in European countries (Maltezou and Poland, 2014). On the other hand, administration of the vaccine at the workplace contributes to the level of vaccination (Hagemester *et al.*, 2018). Therefore, hospitals can organise vaccination on site.

The main limitation of the study concerns the sample involving HCP of one multidisciplinary hospital in Latvia. The participation was voluntary, and the sample included about one-fourth of HCP of the hospital. Opinions of motivated participants can indicate negative or positive tendencies, but a more precise assessment of views of HCP in Latvia remains in question. In addition, data did not include the age and gender of HCP, which can differ regarding attitude towards vaccination (Hagemester *et al.*, 2018). Therefore, further studies require the inclusion of a more representative randomised sample. A more detailed analysis of types of attitudes is needed for a better understanding of possibilities to facilitate vaccination against influenza.

The level of vaccination against influenza in HCP was relatively low, which contrasted with a more positive general attitude towards vaccination of patients and HCP at risk. This contrast provided evidence for preferring reactive rather than proactive actions regarding influenza. High expectations of support from the hospital indicated transferring of some part of personal responsibility to the organisation. Doctors demonstrated better understanding of the dangers involved and had a higher level of vaccination. However, some aspects of doctors' attitudes indicated underestimation of influenza-associated risk.

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#### VAKcinācija pret gripu: VESELĪBAS APRŪPES PERSONĀLA ATTIEKSME LATVIJAS DAUDZNOZARU SLIMNĪCĀ

Veselības aprūpes personāls (VAP) ir pakļauts augstam gripas riskam, jo regulāri kontaktējas ar pacientiem, tai skaitā, gripas. Tomēr lielākajā daļā Eiropas valstu VAP vakcinēti pret gripu mazāk par 40%. Šī pētījuma mērķis bija noteikt VAP attieksmi pret vakcināciju pret gripu un analizēt iespējamās šīs attieksmes iemeslus. Šķērsgrūzuma pētījums tika veikts vienā no Latvijas daudznozaru slimnīcām. Izlasē (n = 1099) bija iekļauti ārsti (239), medmāsas (418), aprūpes personāls (236), administrācija (108) un tehniskā atbalsta personāls (98). Tika uzdoti pieci jautājumi par plānoto pacientu un VAP vakcināciju, zināšanām par pretvīrusu zālēm un to rezervju veidošanas nepieciešamību slimnīcā tūlītējai lietošanai. Rezultāti atklāja, ka VAP regulārās vakcinācijas līmenis bija salīdzinoši zems (14%) un būtiski nesaskanēja viedokļi, ka vakcinācija nepieciešama pacientiem (53%) un personālam (60%). Šis kontrasts liecināja par zemu VAP proaktīvas rīcības līmeni. Savukārt lielas cerības attiecībā uz zālēm, kuras varētu nodrošināt slimnīca (82%), liecināja par daļēju personīgās atbildības nodošanu organizācijai. Kopumā ārsti parādīja labāku izpratni par problēmas izpratni un augstāku personīgas vakcinācijas līmeni nekā citi darbinieki. Tomēr dažas pozīcijas ārstu attieksmē pret vakcināciju pret gripu liecina, ka saistītais risks ir nepietiekami novērtēts.