



Attitudes and knowledge of Health care workers in Cieszyn County of the Silesian Province in southern Poland about seasonal flu vaccinations – preliminary study

Postawy i wiedza pracowników ochrony zdrowia powiatu cieszyńskiego na temat sezonowych szczepień przeciwko grypie – doniesienie wstępne

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Abstract

Introduction. Influenza is one of the more common viral infectious diseases, the occurrence of which is a significant clinical, epidemiological and economic problem. According to reports from the World Health Organization (WHO), around 5%–10% of adults and 20%–30% of children fall ill worldwide every year. During the year, 3–5 million acute cases are registered, and around 250,000–650,000 people die. The annual influenza vaccine is the best method of preventing the disease. Health care workers are a risk group for influenza.

Objective. The aim of the survey was to assess the knowledge and attitudes towards vaccination among health care workers (HCWs).

Materials and method. The study was conducted among a group of 330 randomly selected employees of medical facilities in the Cieszyn County of the Silesian Province in southern Poland. The research tools were a self-made questionnaire and a knowledge test. To assess the statistical significance of differences in qualitative data between the groups, the chi independence test was applied.

Results. 47.6% of the respondents had a low-level of knowledge about flu vaccination, in 41.8% it was at the medium level, and in only 10.6% the knowledge level was high. The average number of points scored in the knowledge test was 4.44 (SD = 2.33) out of 12 points possible. Only every third respondent was in favour of the vaccination. Slightly over 15% of the respondents (17.60%) were vaccinated against influenza in the current 2018–2019 season.

Conclusions. Knowledge about vaccination against influenza is incomplete. A small percentage of health care professionals are in favour of influenza vaccination. There is a need to increase efforts to promote annual influenza vaccination among health care professionals.

Key words

influenza vaccination, health care worker, attitude, knowledge, beliefs

Streszczenie

Cel pracy. Grypa jest jedną z najczęściej występujących wirusowych chorób zakaźnych, stanowiących istotny problem kliniczny, epidemiologiczny i ekonomiczny. Według raportów Światowej Organizacji Zdrowia (WHO) każdego roku choruje na nią ok. 5–10% dorosłych i 20–30% dzieci na całym świecie. W ciągu roku rejestruje się 3–5 mln ostrych przypadków, a ok. 250–650 tys. osób umiera. Coroczne szczepienie przeciw grypie jest najlepszą metodą zapobiegania tej chorobie. Pracownicy ochrony zdrowia stanowią grupę ryzyka zachorowania na grypę. Celem pracy była ocena wiedzy i postaw wobec szczepień wśród pracowników służby zdrowia (HCW).

Materiał i metody. Badania zostały przeprowadzone w grupie 330 losowo wybranych pracowników placówek medycznych na terenie powiatu cieszyńskiego województwa śląskiego. Narzędzie badawcze stanowił kwestionariusz ankiety własnego autorstwa oraz test wiedzy. Aby ocenić statystyczną istotność różnic danych jakościowych pomiędzy grupami, zastosowano test niezależności χ^2 .

Wyniki. 47,6% respondentów posiadało wiedzę na temat szczepień przeciwko grypie na poziomie niskim, 41,8% na poziomie średnim, a tylko 10,6% na poziomie wysokim. Średnia liczba punktów w teście wiedzy wyniosła 4,44 (SD = 2,33) na 12 pkt możliwych. Tylko co trzeci respondent był zwolennikiem szczepienia. Niewiele ponad 15% badanych (17,60%) zaszczepiło się przeciw grypie w sezonie 2018/2019.

Wnioski. Wiedza na temat szczepienia przeciwko grypie jest niepełna. Niewielki odsetek pracowników ochrony zdrowia jest zwolennikiem szczepienia przeciwko grypie. Istnieje konieczność zwiększenia działań promujących coroczne szczepienie przeciwko grypie wśród pracowników ochrony zdrowia.

Słowa kluczowe

wiedza, postawa, przekonania, szczepienie przeciwko grypie, pracownik ochrony zdrowia

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INTRODUCTION

Influenza is one of the more common viral infectious diseases, the occurrence of which is a significant clinical, epidemiological and economic problem. According to the World Health Organization (WHO) reports, around 5%-10% of adults and 20%-30% of children fall ill worldwide every year. Each year, 3–5 million acute cases are registered, and around 250,000–650,000 people die [1, 2]. Flu is a disease in which the constant evolution of the virus contributes to the occurrence of serious seasonal epidemics as a result of point mutations [3]. Due to their contact with influenza patients and the ease of transmission of the influenza virus, medical personnel are particularly vulnerable to infection. The risk of transmission of infection from influenza health care workers to patients is also a big problem. This is especially dangerous for chronically ill persons, the elderly, pregnant women, newborns and young children, who are at high risk of the severe course of the disease. Vaccination of medical personnel against flu is therefore associated not only with a reduced risk of severe consequences of the disease in the vaccinated, but also all those who have contact with them. For this reason, health workers are considered to be an important link and a priority target for influenza vaccination [4]. According to the American Advisory Committee on Immunization Practices (ACIP), vaccinating medical workers against influenza, as in other groups, should be carried out every year [5]. Similar recommendations were included in the Polish Preventive Vaccination Programme, according to which the vaccination against influenza is recommended to employees of medical facilities and administrative staff of these facilities [6]. Despite the awareness of the dangers of flu and its complications, the problem is the small percentage of health care workers undergoing influenza vaccination every year. It is estimated that in Poland only 5–6% of medical workers are vaccinated against influenza, which is one of the lowest rates in Europe [7].

OBJECTIVE

The aim of the study was to assess the attitudes and knowledge about influenza vaccination among healthcare workers.

MATERIALS AND METHOD

The study was conducted among employees of medical facilities in Cieszyn County of the Silesian Province in southern Poland, whose management agreed to the carrying out of the survey. The criterion for inclusion in the study was consent and being a healthcare worker. The survey was conducted in the 2018–2019 season, from December 2018 – March 2019, among nurses, midwives, doctors, paramedics and physiotherapists. The research tool was a self-made questionnaire, consisting of 17 closed questions and a knowledge test, containing 5 questions, both closed and open, multiple-choice, concerning the main research problem, and developed on the basis of available literature. For every correct answer the respondents were awarded 1 point, with the maximum of 12 points for the whole test. The number of points in relation to each person was added and then converted into a percentage scale from 0–100, where

the score of 100 meant that the surveyed person provided the correct answers. The results obtained were then converted into ranges: the respondents who obtained no more than 35% of the points were qualified to the group of persons with a low level of knowledge, those who answered correctly to 36–60% of the questions – to the group of persons with a medium level of knowledge, and those who obtained at least 61% of correct answers – to the group of persons with a high level of knowledge.

Based on the number of employed health care workers meeting the criteria for inclusion, 600 questionnaires were individually distributed, of which 330 (55%) were returned.

Due to the heterogeneity of groups in relation to the variables of age, profession, education, internship and workplace, the answers were merged, resulting in 3 categories regarding age (below 40 years of age, 40–49 years old, and over 50) and 2 categories in relation to occupation (nurse and other medical profession), education (secondary and higher), work experience (less or more than 15 years). Those working in the departments of internal medicine, dermatology, nephrology, neurology, ophthalmology, cardiology, rehabilitation, paediatrics, geriatrics, infectious and intensive care, were classified as conservative wards, while the departments of general surgery, trauma-orthopaedic, gynaecological-obstetric, paediatric surgery, operating theatres and hospital emergency department, were classified as surgical wards.

The majority of the respondents were women (88.8%). The largest group of the respondents were persons aged 45–49 (18.20%), then 50–54 (17.00%) and 40–44 (16.40%). Nurses constituted the vast majority of the respondents (73.60%). Almost half of the respondents (47.90%) declared having secondary education. 63.90% of those surveyed had over 15 years of work experience. The detailed characteristics of the studied group are presented in Table I.

RESULTS

The results obtained were entered into the Excel 2016 spreadsheet, while the statistical calculations were made using the SPSS (Statistical Package for the Social Sciences) 24.0.0.1 Software. The maximum allowable type I error was assumed to be $\alpha = 0.05$ for all analyses, and a value was considered statistically significant when $p \leq 0.05$. To assess the statistical significance of differences in qualitative data between the groups, the chi independence test was used². The choice of the test was dictated by the nature of the variables involved in the analysis. In each case, these were qualitative variables (measured at the nominal or ordinal level).

As for the knowledge level of surveyed, 47.6% of the respondents had a low-level of knowledge of flu vaccination, in 41.8% it was at the medium level, and in only 10.6% at the high level. The average number of points in the knowledge test was 4.44 points (SD = 2.33) out of 12 achievable (Tab. 2). Detailed analysis of the answers given in the knowledge test showed that almost 80% of the respondents (79.10%) knew that seasonal influenza vaccination is recommended to health care professionals. 90% of the respondents believed that medical personnel are exposed to influenza virus infection through droplet transmission, and almost 30% (27.27%) through physical contact. As far as influenza complications were concerned, the most frequently listed were cardiological (78.42%) and pulmonary (68.39%). Every

Table 1. General characteristics of the studied group

Sex	N	%
Women	293	88,80
Men	37	11,20
Age [years]		
25–29	49	14,80
30–34	26	7,90
35–39	27	8,20
40–44	54	16,40
45–49	60	18,20
50–54	56	17,00
55–59	49	14,80
60–64	7	2,10
>65	2	0,60
Profession		
Nurse	243	73,60
Midwife	12	3,60
Paramedic	23	7,00
Physician	28	8,50
Physiotherapist	9	2,70
Other	15	4,50
Education		
Vocational	4	1,20
Secondary	158	47,90
Higher vocational	60	18,20
Higher	108	32,70
Workplace		
General surgery department	19	5,80
Trauma and orthopedic department	25	7,60
Internal medicine department	31	9,40
Intensive care unit	31	9,40
Gynecological-obstetrics department	8	2,40
Pediatric ward	50	15,20
Nephrology department	6	1,80
Emergency ward	40	12,12
Pediatric surgery ward	7	2,10
Operating room	11	3,30
Dermatological ward	9	2,70
Geriatric ward	11	3,30
Cardiology department	8	2,40
Neurology department	13	4,00
Ophthalmological department	10	3,00
Rehabilitation ward	8	2,40
Infectious disease ward	14	4,30
Other	28	8,50
Seniority [years]		
<1	8	2,40
1–4	39	11,80
5–9	41	12,40
10–14	31	9,40
>15	211	63,90

N-number of respondents, %-percentage

Table 2. Descriptive statistics of the subjects' knowledge

	N	M	SD	Min	Maks	Q25	Me	Q75
Knowledge	330	4,44	2,33	0,00	12,00	2,00	5,00	6,00
Knowledge %	330	37,05	19,47	0,00	100,00	17,00	42,00	50,00

N – number of respondents; M – average; SD – standard deviation; Min – minimum; Maks – maksimum; Q25 – first quartile; Me – mediana; Q75 – third quartile

fifth respondent indicated neurological complications, and every fourth stressed the exacerbation of chronic diseases. Among flu prevention measures, the staff surveyed most often mentioned proper hygiene procedures (64.13%) and protective vaccinations (33.74%). Nearly 15% (14.29%) mentioned pharmacological prophylaxis which, however, is not recommended in routine procedures. According to 76.40% of the respondents, there are contraindications for vaccination against influenza. It is worrying that among the contraindications, in addition to infection with fever and intolerance to the vaccine component, the respondents listed planning to or actually being pregnant (34.7%).

Subsequently, attempts were made to determine whether gender had an impact on the level of knowledge. 47.8% women and 45.9% men had a low level of knowledge. The average level of knowledge was found in 42.3% women and 37.8% men, while 9.9% women and 16.2% men revealed a high level of knowledge. There was no relationship between the level of knowledge and the gender of the respondents ($p > 0.05$).

In the next stage, the level of knowledge depending on age was analysed. 30.90% of the respondents were under the age of 40, in the group of persons aged 40–49 and > 50 years the percentage was the same and amounted to 34.50%. 51.0% of the respondents under the age of 40 had a low level of knowledge, 45.6% of those aged between 40–49, and 46.5% of those aged 50. On the other hand, 16.7% of the respondents under the age of 40, 5.3% at the age of 40–49 and 10.5% over 50, presented a high level of knowledge. Respondents under 40 years of age significantly more often had a high level of knowledge ($p < 0.05$) (Tab. 3).

Table 3. The relationship between the level of respondents' knowledge and age

Knowledge level		Age [years]			$\chi^2 = 10,647$ $df = 4$ $p = 0,031$
		<40	40–49	>50	
low	N	52	52	53	
	%	51,0	45,6	46,5	
average	N	33	56	49	
	%	32,4	49,1	43,0	
high	N	17	6	12	
	%	16,7	5,3	10,5	
Altogether	N	102	114	114	
	%	100,0	100,0	100,0	

χ^2 – test statistic; df – degrees of freedom; p – statistical significance

Subsequently, the level of knowledge depending on occupation was examined. 10.3% of nurses and 11.5% of the respondents working in another medical sphere had a high level of knowledge, whereas 44.0% of nurses and 57.5% of other professionals had a low level of knowledge. The differences, however, were not statistically significant ($p > 0.05$) (Tab. 4).

Table 4. The relationship between the level of respondents' knowledge and the profession

		Profession			
		N	%		
Knowledge level	low	N	107	50	$\chi^2 = 5,805$ $df = 2$ $p = 0,055$
		%	44,0	57,5	
	average	N	111	27	
		%	45,7	31,0	
	high	N	25	10	
		%	10,3	11,5	
Altogether	N	243	87		
%		100,0	100,0		

χ^2 – test statistic; df – degrees of freedom; p – statistical significance

Table 5. The relationship between the level of knowledge of the respondents and education

		Education			
		N	%		
Knowledge level	low	N	80	77	$\chi^2 = 8,672$ $df = 2$ $p = 0,013$
		%	49,4	45,8	
	average	N	73	65	
		%	45,1	38,7	
	high	N	9	26	
		%	5,6	15,5	
Altogether	N	162	168		
%		100,0	100,0		

χ^2 – test statistic; df – degrees of freedom; p – statistical significance

Secondary education, including vocational, was declared by 49.10% of those surveyed, while a bachelor's and master's degree by 50.90%. 49.4% of the respondents with secondary education and 45.8% with higher education had a low level of knowledge. On the other hand, 5.6% of people with secondary education and 15.5% with higher education presented a high level of knowledge. Persons with higher education were significantly more likely to have a high-level of knowledge about flu vaccination (Tab. 5).

The respondents were asked whether the workplace – surgical (26.70%) or conservative (73.30%) department, affects the level of knowledge. A low level of knowledge was found in 52.3% of the respondents employed in surgical departments and in 46.1% of those employed in conservative departments. On the other hand, 9.1% of the employees of surgical departments and 11.2% of conservative departments had a high level of knowledge. The differences, however, were not statistically significant ($p > 0.05$).

Considering the seniority of the respondents, it was found that 49.6% of those who had worked for less than 15 years and 46.4% of those who had worked for more than 15 years had a low level of knowledge. 14.3% of the persons with seniority below 15 years and 8.5% with seniority over 15 years had knowledge at a high level. The differences were, however, not statistically significant ($p > 0.05$).

When analysing the replies to questions regarding the attitudes and beliefs of the respondents about influenza vaccination, it was found that only every third respondent

Table VI. Detailed description of the answers provided

Supporter of influenza vaccination	N	%
Yes	110	33,30
No	220	66,70
Flu vaccination in current season		
Yes	58	17,60
No	272	82,40
Vaccination		
Annually	43	13,00
Occasionally	56	17,00
First time this season	9	2,70
Never	222	67,30
Willingness to vaccinate if it was refunded		
Yes	109	33,00
No	221	67,00
Do you recommend influenza vaccination?		
Always	31	9,40
Often	66	20,00
Seldom	76	23,00
Never	157	47,60
Inclusion of free vaccinations in the workplace		
Yes	180	54,50
No	150	45,50
Fear of getting the flu		
Yes	132	40,00
No	198	60,00
Work despite symptoms indicative of a current respiratory infection		
Never	56	17,00
Seldom	201	60,90
Often	73	22,10
Do you think that you are at risk of influenza?		
Yes	204	61,80
No	126	38,20
Why flu vaccination?		
According to recommendations	17	24,64
I'm vaccinated every year	25	36,23
I care about my health	34	49,28
I care about my relatives health	18	26,09
I care about my patients health	9	13,04
Reasons for the lack of vaccination decision		
No evidence of the effectiveness of the vaccine	51	19,25
The conviction of low effectiveness	130	49,06
Fear of an adverse reaction to vaccination	55	20,75
Lack of time	30	11,32
The need to pay	13	4,91
Fear of injection	12	4,53
Other	14	5,28

N-number of respondents, %-percentage

was in favour of vaccination. Slightly over 15% of respondents (17.60%) declared that they had been vaccinated against influenza in the current 2018–2019 season. The vast majority of respondents replied that they had never been vaccinated

against influenza, and only 13% said they were vaccinated every year. One in three would consider vaccinating if it was refunded. Almost half of the respondents replied that they never recommended vaccinating to their patients. 54.5% of the respondents said they could get a flu vaccination free of charge in the workplace. Most respondents (60%) were not afraid of getting the flu, despite the fact that 61.80% thought they were at risk. Only 17.00% of the respondents said that they never undertook work while having the symptoms of flu infection. Nearly half of the respondents (49.06%) voiced the belief that the vaccine was of low effectiveness as justification for the lack of vaccination (Tab. 6).

DISCUSSION

Annual vaccination is the most effective way to prevent and control the health and economic effects associated with getting influenza [8]. Health care professionals play a key role in promoting the vaccination and setting an example to their patients. Vaccination against influenza should be administered to protect oneself and family against falling ill and spreading the virus into the home environment, and to protect patients from falling ill.

The subject of mandatory vaccination against influenza among health care professionals, however, raises much controversy and is full of ethical and legal implications. While some researchers maintain that patient protection is the responsibility of hospitals, and hence the vaccination of employees against influenza should be mandatory [9], other researchers argue that the lack of scientific reports confirming the effectiveness of vaccination and, as such, mandatory vaccination against influenza remains a challenge for health care professionals and remains an open issue [10, 11].

The decision to use vaccinations is influenced by another aspect, often highlighted in publications – the ethical aspect. Some researchers believe that if vaccinated personnel rates are not optimal and campaigns promoting vaccinations are fruitless, mandatory vaccination policies may be introduced. The report from the survey of the National Programme for Combating Influenza (OPZG) stated that a significant proportion of health care workers do not perceive a relationship between the incidence of influenza and health, and the possibility of transmitting the disease to patients [12]. This is confirmed by the research of the authors of the current survey, where most respondents were not afraid of getting the flu. Therefore, it is suggested that there should be a moral order to carry out vaccination in the group of health care workers [13–15]. In the research by Gołębiak et al. [16], the respondents were asked about the ethical nature of influenza vaccination. The results showed that 83% of the staff working in outpatient departments accept the ethical aspect of vaccination; in the group of hospital employees it was 55%, which in total for all the respondents amounted to 66% of respondents [16].

The literature increasingly emphasizes a better understanding of the psycho-social determinants of the personal decision to get vaccinated against influenza [17]. A number of studies on decision models have been developed to assess vaccination predictive factors. According to these models, the decision to get vaccinated against influenza is mainly due to the belief that the susceptibility to influenza

infection is high, and that influenza is a serious infectious disease, whereas the lack of vaccination is due to the belief that vaccination has serious side effects and is not effective [18, 19]. In own study, in the group of persons who declared that they had been vaccinated, almost a half (49.28%) stated that they got vaccinated because they cared about their health, over 25.0% of the respondents said that they got vaccinated because they cared about the health of their families, and 13.04% because they cared about the health of their patients. However, in the group of the non-vaccinated persons, the most frequently cited reason for such a decision was the belief that the vaccine's effectiveness was low (49.06%).

Despite almost 10 years of efforts and extensive campaigns to vaccinate health care professionals in most European countries, vaccination coverage is still low in this group [20]. In own study, the percentage of vaccinated persons was similar to Italian studies, but considerably lower than in other countries, such as the United States (90.5%), the United Kingdom (68.7%), and other European countries (40%–45%)[20–25].

The results of research by Harris et al. showed that a higher vaccination rate against influenza occurred in the situation of legal fortifications resulting from internal regulations of the health care facility, activities promoting vaccination, and the possibility of administering the vaccination free of charge for a period longer than one day [26]. In own research, only every third person would have had themselves vaccinated if the vaccine had been refunded.

In Poland, there is little data on the vaccination status of medical personnel and reports assessing knowledge and allowing to get to know the opinion of healthcare workers about influenza vaccination. However, studies available in the literature show that relatively few medical workers undergo vaccination [14]. The results of the current survey indicate that there is a need to improve the level of support for seasonal influenza vaccination among health care workers. This is due to the fact that only every third respondent is in favour of vaccination, and in the current season (2018–2019) only 17.6% declared that they have been vaccinated, and only 13% are vaccinated annually. Similar results were obtained by Sternal and Owsianko, stating that 20.2% of their respondents performed irregular vaccinations, while 12.5% of the respondents had themselves vaccinated regularly every year [27]. Of particular concern is the fact that in Poland a small part of the nursing staff is vaccinated, and it is the nurse who is the person who has the most frequent contact with patients [16, 27, 28]. In the literature, the main reason for such a small group of workers undergoing vaccination is the lack of adequate knowledge about this type of flu prevention [14, 28]. In own research, vaccination as a prevention measure against influenza was reported by just over 30% of employees. The need to educate and promote health prevention rests on the shoulders of all health care professionals. It is advisable that this education should be properly organized, purposeful and, regular, and the attitudes presented by the interdisciplinary team well grounded and based on current medical knowledge and the recommendations of international organizations [29].

However, own research has shown that knowledge about seasonal influenza vaccination is low, and only every fourth person surveyed acted in accordance with the recommendations. Financial considerations are one of the important reasons for not vaccinating medical staff [16, 27]. In own study, the need to pay for the vaccinations is given

by 15.50% as the reason for not vaccinating. The impact of funding on vaccination is confirmed by American studies, where the vaccination rate was the lowest among medical workers whose employers did not require vaccinations, did not promote them, and did not provide free access to vaccines [30]. The results of the survey conducted among employees of medical facilities under the OPZG project indicate that one of the main factors determining the implementation of preventive vaccinations is providing free access to them at the workplace. Only every third respondent declared that their employer runs free vaccinations for medical staff before and during the flu epidemic season [31]. In own study, however, more than half of the respondents declared that they had access to free vaccination in the workplace, and yet they did take advantage of this type of preventive measure. At the same time, less than 5.0% of the respondents (4.91%) mentioned the necessity to pay as an argument for not being vaccinated. Another recurring reason why health care professionals do not get vaccinated against influenza is the fear of the vaccine and its adverse effect – Vaccine Adverse Effect (VAE) [14]. In the publication by Gołębiak et al., the fear of VAE was brought up as the argument by 31% of the personnel for not being vaccinated [16]. In the study by nSternal et al., 16% of the respondents expressed anxiety about VAE [27], and in own study, every fifth person reported the fear of VAE as the reason for deciding not to get vaccinated.

CONCLUSIONS

- 1) Healthcare professionals' knowledge of influenza and seasonal vaccinations is incomplete.
- 2) Few healthcare workers are vaccinated against influenza in the Cieszyn powiat.
- 3) The main reason for getting vaccinated is the desire to protect oneself against the illness, while the reason for not getting it is the lack of trust in the vaccine's effectiveness.
- 4) A significant percentage of healthcare workers surveyed do not recommend seasonal influenza vaccination for their patients.
- 5) There is a need to increase efforts to promote annual influenza vaccination among healthcare workers in Cieszyn County of the Silesian Province.

In conclusion, it should be noted that there are many factors behind the decision for or against influenza vaccination. The observations obtained may serve as a voice in the discussion on the need to improve educational activities in the field of preventive vaccinations among health care workers. Therefore, it is worth focusing on effective education that will allow the creation of a positive attitude and form favourable opinions about vaccinations, which will result in the decision to undergo regular vaccination.

REFERENCES

1. Bednarska K, Hallmann-Szelińska E, Kondratiuk K, Brydak LB. Influenza surveillance. *Postepy Hig Med Dosw.* 2016; 70: 313–318. DOI: 10.5604/17322693.1199709
2. World Health Organization. Influenza (Seasonal). [https://www.who.int/news-room/fact-sheets/detail/influenza-\(seasonal\)](https://www.who.int/news-room/fact-sheets/detail/influenza-(seasonal)) (access: 05.05.2019).
3. Brydak LB. Skutki zdrowotne i ekonomiczne zakażeń grypą w aspekcie zdrowia publicznego. *Pol Prz Nauk Zdr.* 2016; 4(49): 401–407.
4. Mereckiene J. European Centre for Disease Prevention and Control. Seasonal influenza vaccination in Europe: overview of vaccination recommendations and coverage rates in the EU Member States for 2012–2013 influenza season. Stockholm: ECDC; 2015. ISBN 978-92-9193-618-2. DOI 10.2900/693898
5. CDC. Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR. Recommendations and reports: Morbidity and mortality weekly report. Recomm Rep.* 2011; 60 (RR-7): 1–45.
6. Announcement of the Chief Sanitary Inspector of 25th October 2018 regarding the Protective Vaccination Program for 2019. *Dz. Warsaw,* on 25th October 2018. Item 104
7. Nitsch-Osuch A, Brydak LB. Szczepienia przeciwko grypie u personelu medycznego. *Med Pr.* 2013; 64: 119–129. <https://doi.org/10.13075/mp.5893/2013/0011>
8. Wilde JA, McMillan JA, Serwint J, Butta J, O'Riordan MA, Steinhoff MC. Effectiveness of influenza vaccine in health care professionals: a randomized trial. *JAMA* 1999; 281: 908–913. DOI: 10.1001/jama.281.10.908
9. Wicker S, Marckmann G. Vaccination of health care workers against influenza: Is it time to think about a mandatory policy in Europe? *Vaccine* 2014; 32(38): 4844–4848. DOI: 10.1016/j.vaccine.2013.09.062
10. Hulo S, Nuvoli A, Sobaszek A, Salembier-Trichard A. Knowledge and attitudes towards influenza vaccination of health care workers in emergency services. *Vaccine* 2017; 35(2): 205–207. DOI: 10.1016/j.vaccine.2016.11.086
11. Randall LH, Curran EA, Omer SB. Legal considerations surrounding mandatory influenza vaccination for healthcare workers in the United States. *Vaccine* 2013; 31(14): 1771–1776. DOI: 10.1016/j.vaccine.2013.02.002
12. Kmiecik T, Otocka-Kmiecik A, Ciebada M, Górski P. Vaccinations against influenza in groups of risk – Polish and global recommendations. *Med Dypl.* 2009; 8(161): 55–60.
13. Johnson DR, Nichol KL, Lipczyński K. Barriers to adult immunization. *Am J Med.* 2008; 121: 28–35. DOI: 10.1016/j.amjmed.2008.05.005
14. Grzela AM, Panczyk M, Gotlib J. The opinions of health care employees on vaccinating against influenza – preliminary reports. *Piel Pol.* 2016; 2(60): 158–164.
15. Ethics of mandatory vaccination for healthcare workers. <https://pdfs.semanticscholar.org/4cab/706c4b2aa42481c40c59f7517f85fe51cf8b.pdf> (access: 14.01.2019).
16. Gołębiak I, Pulkowska-Nowocień A, Topczewska-Cabanek A, Dawgiałło M, Życińska K, Nitsch-Osuch A. Knowledge, perception and the execution of vaccinations against influenza among the nursing Staff. *Fam Med Prim Care Rev.* 2015; 17(1): 15–18.
17. To KW, Lai A, Lee KCK, Koh D, Lee SS. Increasing the coverage of influenza vaccination in healthcare workers: review of challenges and solutions. *J Hosp Infect.* 2016; 94: 133–142. DOI: 10.1016/j.jhin.2016.07.003
18. Becker MH, Maiman LA. Sociobehavioral determinants of compliance with health and medical care recommendations. *Med Care.* 1975; 13: 10–24.
19. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991; 50: 179–211, [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
20. Mereckiene J, Cotter S, Nicoll A, Lopalco P, Noori T, Weber J, et al. Seasonal influenza immunisation in Europe. Overview of recommendations and vaccination coverage for three seasons: pre-pandemic (2008/09), pandemic (2009/10) and post-pandemic (2010/11). *Euro Surveill* 2014; 19(16): 20780; <https://doi.org/10.2807/1560-7917.ES2014.19.16.20780>
21. Maggiore UL, Scala C, Toletone A, Debarbieri N, Perria M, D'Amico B, Montecucco A, Martini M, Dini G, Durando P. Susceptibility to vaccine-preventable diseases and vaccination adherence among healthcare workers in Italy: A cross-sectional survey at a regional acute-care university hospital and a systematic review. *Hum Vaccin Immunother.* 2017; 13(2): 470–476, <https://doi.org/10.1080/21645515.2017.1264746>
22. Black CL, Yue X, Ball SW, Fink RV, de Perio MA, Laney AS, Williams WW, Graitcer SB, Fiebelkorn AP, Lu PJ, et al. Influenza vaccination coverage among health care personnel—United States, 2017–2018 Influenza Season. *Morb Mortal Wkly Rep.* 2018; 67: 1050–1054.
23. Public Health England. Seasonal influenza vaccine uptake amongst frontline healthcare workers (Hcws) in England: February Survey 2017/2018. 2018. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692969/Seasonal_Flu_Vaccine_February_Report_2018.pdf (access: 28.11.2019).
24. Boeyl L, Bral C, Roelants M, De Schryver A, Godderis L, Hoppenbrouwers K, Vandermeulen C. Attitudes, beliefs, determinants and

- organisational barriers behind the low seasonal influenza vaccination uptake in healthcare workers—A cross-sectional survey. *Vaccine* 2018; 36: 3351–3358.
25. Hagemester MH, Stock NK, Ludwig T, Heuschmann P, Vogel U. Self-reported influenza vaccination rates and attitudes towards vaccination among health care workers: Results of a survey in a German university hospital. *Public Health* 2018; 154: 102–109.
26. Harris K, Maurer J, Black C, Euler G, Kadiyala S. Workplace efforts to promote influenza vaccination among healthcare personnel and their association with uptake during the 2009 pandemic influenza A (H1N1) *Vaccine*. 2011; 29: 2978–85. DOI: 10.1016/j.vaccine.2011.01.112
27. Sternal D, Owsianko A. Opinie personelu medycznego na temat zalecanych szczepień przeciwko grypie. *Med Og Nauk Zdr*. 2019; 25(1): 16–21. <https://doi.org/10.26444/monz/104752>
28. Zielonka TM, Lesiński J, Życińska K, Machowicz R, Królikowski K, Wardyn AK. Vaccinations against influenza among the medical staff of research and teaching hospitals in Warsaw and students of the Medical University of Warsaw. *Med Pr*. 2009; 60(5): 369–375.
29. Bednarek A, Zarzycka D. The need for and the assumptions of modern education illustrated with the example of preventive vaccinations. *Probl Hig Epidemiol*. 2015; 96 (1): 1–7.
30. Influenza Vaccination Coverage Among Health Care Personnel – United States, 2016–17 Influenza Season. <https://www.cdc.gov/mmwr/volumes/66/wr/mm6638a1.htm> (access: 04.01.2019).
31. Vaccination against influenza among healthcare workers in Poland – present and future prospects. Analysis of the results of the survey conducted among healthcare workers (the report was created as part of the implementation of the National Program for Combating Flu. www.opzg.pl