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## Knowledge and compliance with recommendations for seasonal influenza vaccination among medical and dental students

**Anna Kawalec**

Department of Hygiene, Wrocław Medical University, Wrocław, Poland

E-mail address: [anna.m.kawalec@wp.pl](mailto:anna.m.kawalec@wp.pl)

### ABSTRACT

Vaccination against seasonal influenza is recommended for everyone older than 6 months. It is underlined, that healthcare workers and students may contribute to nosocomial influenza transmission, however, flu vaccination rate among medical staff remains low. The aim of this study was the assessment of knowledge of flu vaccination recommendations and compliance with them among medical and dental students in conjunction with analysis of potential differences according to the type of faculty. The study was conducted from 10th to 16th October 2017 with the use of anonymous survey among 203 healthcare students of Wrocław Medical University (131 medical students, 72 dentistry students). The questionnaire was divided into 3 sections: demographic data, vaccination status, knowledge of recommendations. Obtained data showed that declared vaccination rate in season 2016/2017 was 15.82%, and 13.92% in 2015/2016. Although we observed that influenza vaccination coverage was higher among dental students, the difference was statistically insignificant. Knowledge of recommendations was good, 78% of students knew, that influenza vaccination is recommended for healthcare workers, and 73% answered, that it also concerns healthcare students. Significant differences in identification of groups, for which flu vaccination is especially recommended, were observed. Dental students more frequently chose all correct answers ( $p$ -value 0,006). Also sources of knowledge differed ( $p$ -value 0,007), medical students more often declared using professional medical journals, while dental students more frequently indicated impact of family. Although the knowledge of recommendations for influenza vaccination is rather good among students, vaccination coverage remains low. Identification of gaps in students' knowledge and differences according to faculty, may suggest directions in which activities promoting regular vaccination against influenza should concentrate.

**Keywords:** influenza vaccines, medical staff, medical students, dental students

## **1. INTRODUCTION**

Influenza is an acute viral disease, with symptoms mainly from upper respiratory tract. The course of flu is usually mild, however there are specific health conditions which are connected with higher risk for severe influenza-related complications [1]. In particular, this concerns older people, pregnant women, young children, and individuals with chronic diseases, or immunosuppression [1]. According to data published by National Institute of Public Health, over 4.3 millions of influenza and probable influenza cases were reported in Poland, in 2016. Seasonal influenza is preventable due to available vaccines, which are reviewed annually and updated in order to best match circulating influenza viruses. Although, regular vaccination is recommended for everyone 6 months and older, and especially for specific groups due to clinical conditions or epidemiological reasons, flu vaccination coverage in general population is low. It is estimated that in season 2014/2015 vaccination rate against influenza in Poland was 3.4% [2].

In recommendations it is underlined, that among some occupational groups regular vaccination against influenza is very important. According to both Polish Immunization Programme and *European Centre for Diseases Prevention and Control (ECDC)*, apart from healthcare workers, these occupational groups include public transport, police and fire service, military, border or immigration control and customs, educational staff, and others.

In the scope of healthcare workers, there are three main reasons for regular vaccination against influenza. Firstly, medical staff is more exposed to different viruses on a daily basis and has higher risk for infections due to the nature of their work. Secondly, healthcare workers can spread influenza viruses to their patients, who may be especially vulnerable to influenza-related complications due to their health conditions. Therefore, medical personnel should get flu vaccine each season, as prevention of nosocomial influenza infections in order to protect their patients, and also co-workers and family members. In addition, regular seasonal flu vaccine of healthcare workers is cost-effective for healthcare institutions, because of reduced staff illness and absenteeism, as according to randomized trials, vaccinated healthcare workers had fewer lost work days due to respiratory infections [3, 4].

Noteworthy, according to *Centres for Diseases Control and Prevention (CDC)* and *World Health Organization*, healthcare workers include either professionals and students. The definition provided by CDC states precisely that healthcare workers include “physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health-care facility, and persons (e.g., clerical, dietary, housekeeping, laundry, security, maintenance, administrative, billing, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from health care workers and patients.” Therefore, as healthcare students may also spread flu viruses to patients, in presented study the focus is on knowledge of and compliance with recommendations for seasonal influenza vaccination among this group.

## **2. OBJECTIVE**

Assessment of knowledge of flu vaccination recommendations and compliance with them among medical and dental students in conjunction with analysis of potential differences

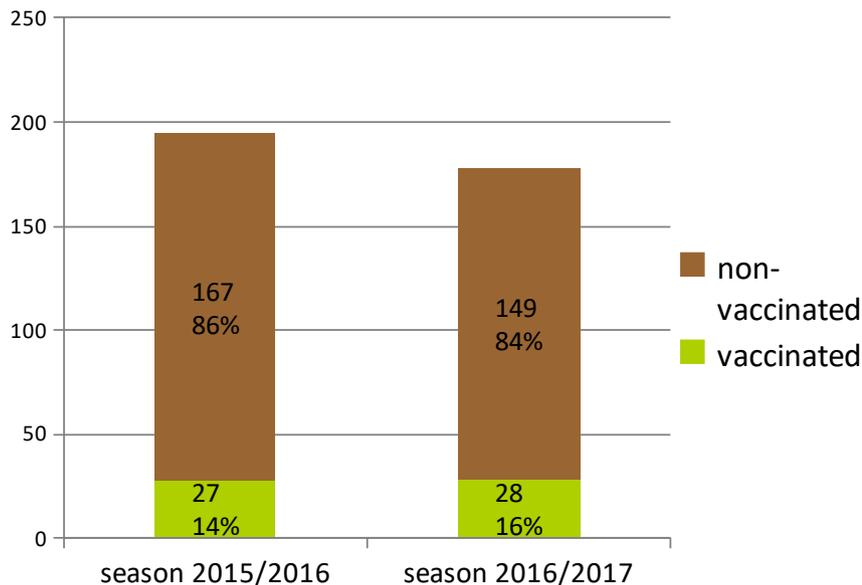
according to the type of faculty. In particular, the assessment of influenza vaccination rate among students in season 2016/2017 and 2015/2016, the knowledge of recommendations for seasonal influenza vaccination among study group, and main sources of knowledge about influenza and seasonal flu vaccination.

### 3. MATERIAL AND METHODS

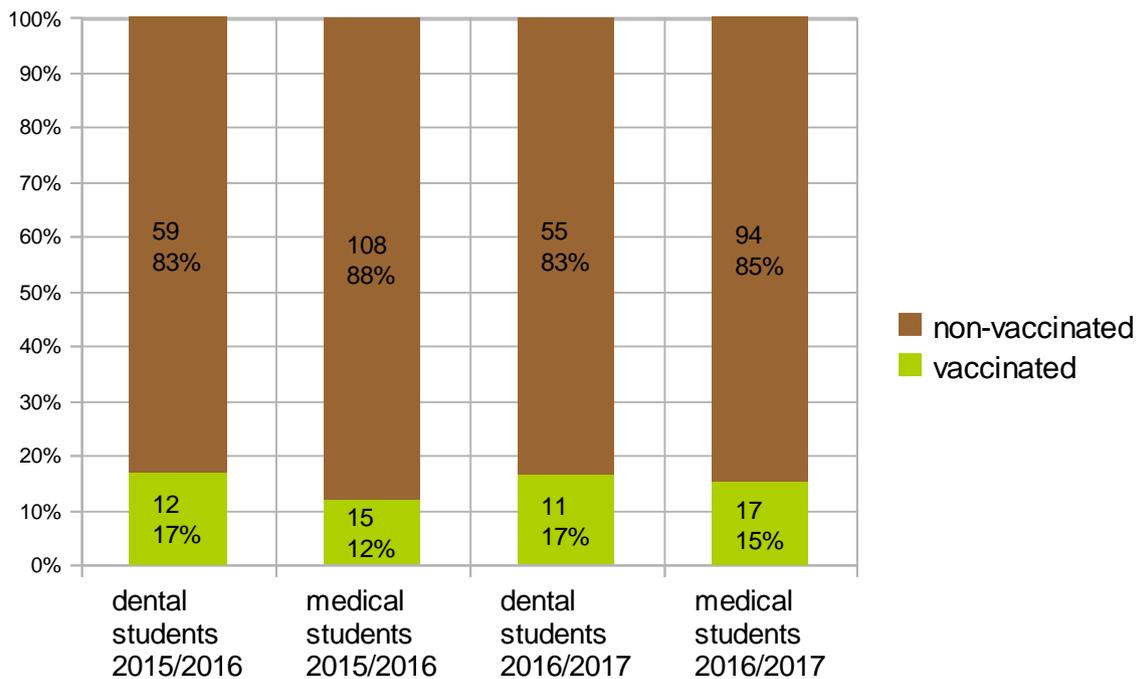
Pilot study was conducted from 10th to 16th October 2017 with the use of anonymous survey. Study group consisted of 203 healthcare students of Wroclaw Medical University, during first year of their clinical training (131 medical students, 72 dental students). Mean age of participants was  $21 \pm 2$  years, with sex structure of participants: 61% females, 31% males (no data in 17 cases). The anonymous questionnaire was divided into 3 sections: demographic data, declared vaccination status in seasons 2016/2017 and 2015/2016, knowledge of recommendations for seasonal influenza vaccination (frequency of immunization, recommendations for healthcare workers and healthcare students, identification of specific groups, for which flu vaccine is especially recommended according to Polish Immunization Programme 2017, and main sources of knowledge). Statistical analysis of obtained data was performed with the use of Chi-square test and Fisher exact test, with assumed significance level of p-values below 0,05. Study had been approved by Bioethics Committee at Wroclaw Medical University, with the consent No. KB 405/2017.

## 4. RESULTS

### 4. 1. Vaccination rate among medical and dental students



**Figure 1.** Declared vaccination status among students in 2015/2016 and 2016/2017.



**Figure 2.** Declared vaccination status according to type of faculty in season 2015/2016 and 2016/2017.

In general, declared vaccination rate against influenza was 15.82% in season 2016/2017, and was higher than in season 2015/2016 (Figure 1). There were no differences in vaccination rate between female and male students. Regular vaccination in two previous seasons declared 9.85% of participants (11.11% of dental students and 9.16% of medical students).

Although higher vaccination rate was observed among dental students in comparison to medical students, the difference was statistically insignificant (Figure 2).

#### 4. 2. Knowledge of recommendations and sources of knowledge

Knowledge of recommendations among students was good, and about 90% of participants knew that flu vaccine should be administered each epidemiological season, that is annually (Figure 3). Over 70% of students correctly answered that seasonal influenza vaccination is recommended for both healthcare workers and healthcare students (Figure 4).

However, more doubts and lack of knowledge (“I don't know” answers) were observed in the field of recommendations for healthcare students. There were no differences between vaccinated and not-vaccinated students in the scope of knowledge of recommendations for healthcare workers, neither in general study group (p-value 0.6), nor within the subgroup of medical or dental students (p-value respectively 0.76 and 0.18).

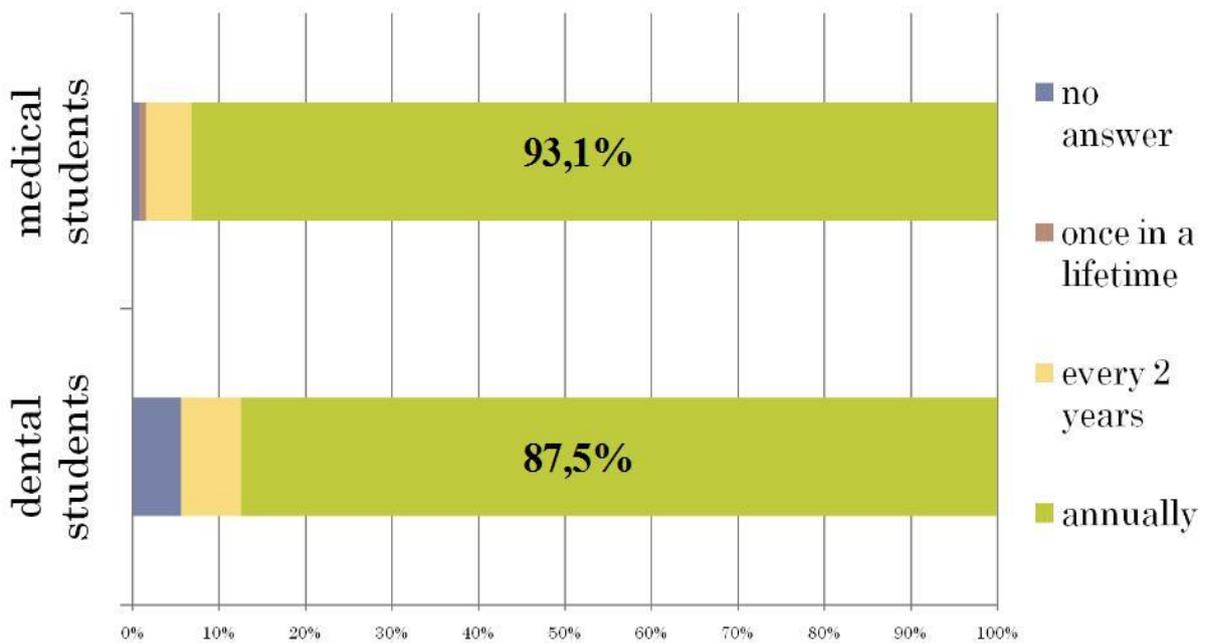


Figure 3. How often one should get vaccinated?

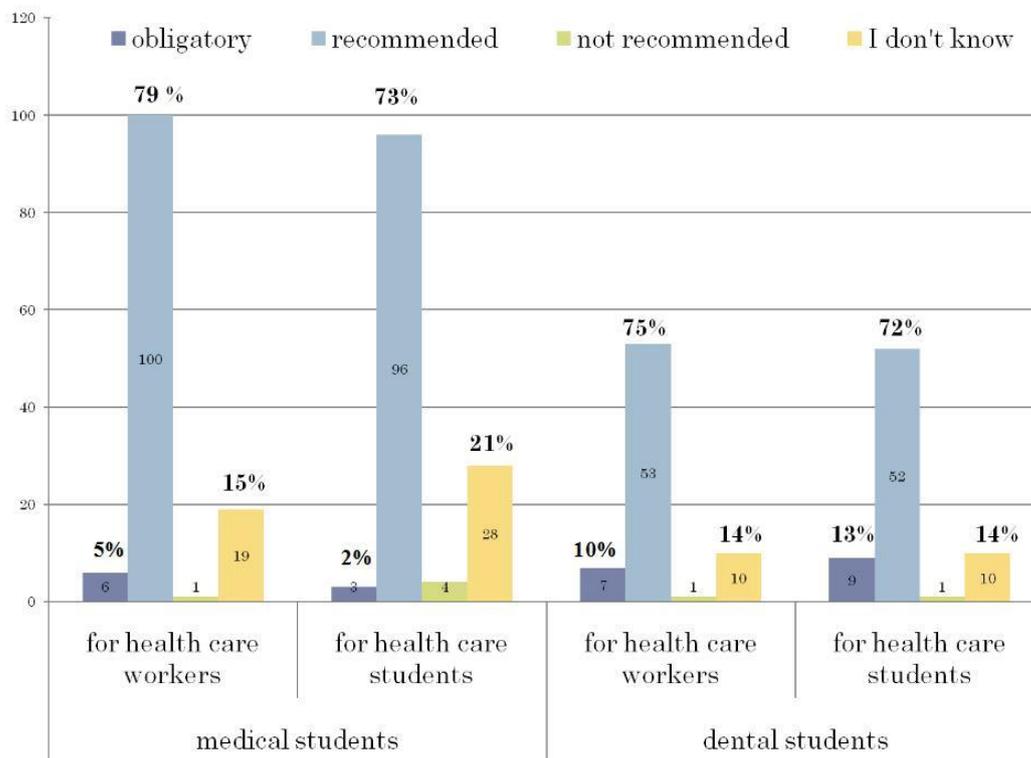
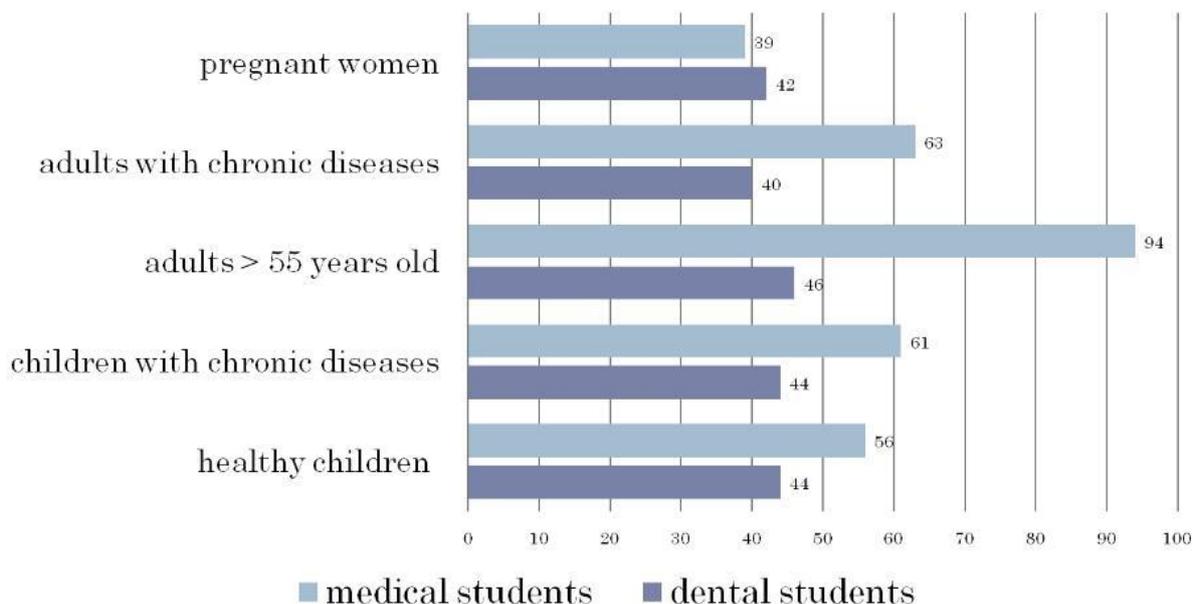


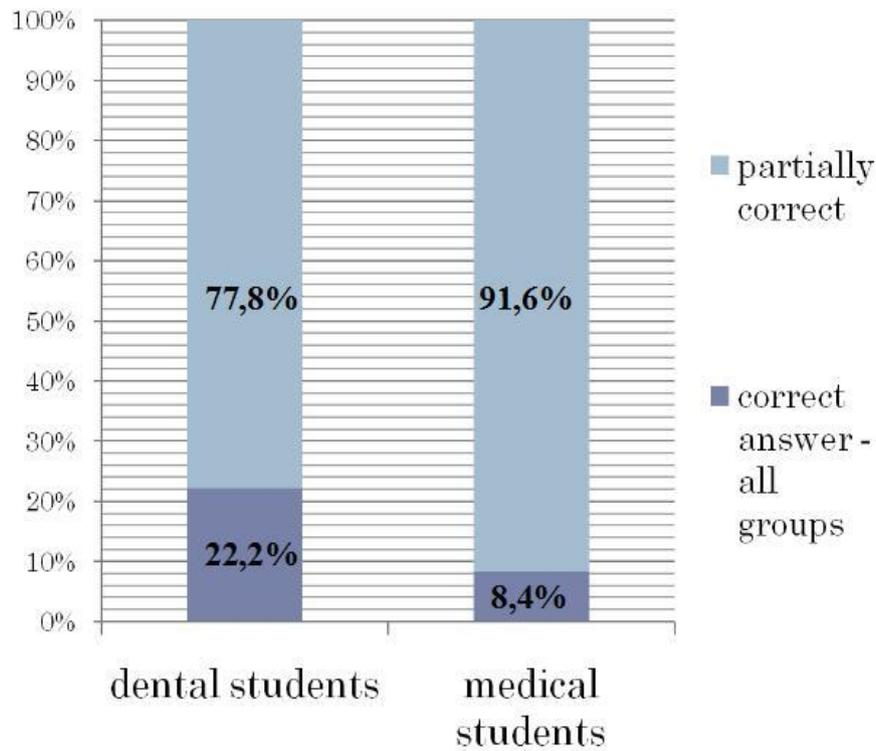
Figure 4. Knowledge of recommendations for healthcare workers and healthcare students.

Knowledge of groups, for which seasonal flu vaccine is especially recommended according to Polish Immunization Programme, due to their health condition or epidemiological reasons, is presented in Figure 5. It was assumed, according to recommendations in Polish Immunization Programme 2017, that flu vaccine is especially recommended for adults aged 55 and more, although according to *Centres for Diseases Control and Prevention* flu vaccine is especially advised for people aged 65 years and older. Nevertheless, most of students knew that older adults are at higher risk for severe influenza and related serious complications. Among medical students more diverse answers were observed. In addition, medical students were not aware that influenza vaccine is recommended for pregnant women. Identification of all the groups for which immunization against seasonal influenza is especially recommended differed according to the faculty (p-value 0,0055). Dental students chose all of the groups more frequently than medical students (Figure 6).

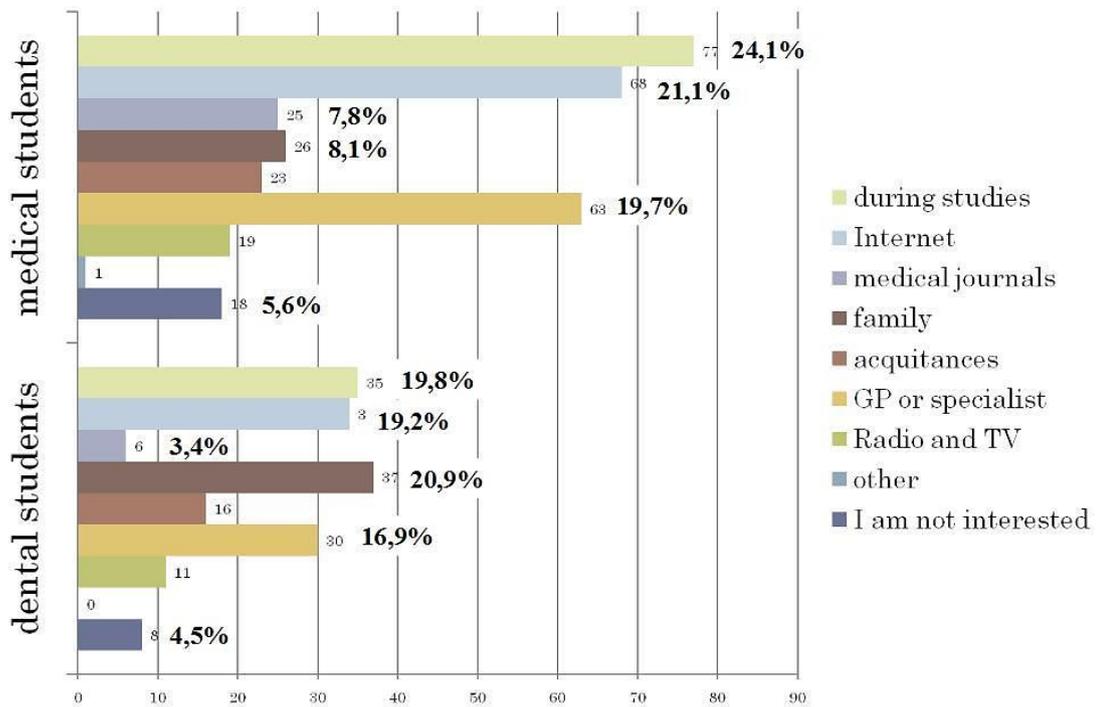


**Figure 5.** Knowledge of groups for which influenza vaccination is especially recommended according to Polish Immunization Programme.

Misconceptions about the flu and seasonal influenza vaccines are widespread in community and may affect the intention or decision of vaccination. Therefore, in the survey there was a question asking about how students get information about the problem of seasonal influenza and the flu vaccines. Surprisingly, main sources of knowledge about influenza and influenza vaccination indicated by students differed according to the type of faculty (p-value 0.0066) (Figure 7). Three main sources of knowledge among medical students were: studies (24.1%), the Internet (21.1%) and General Practitioner or specialist (19.7%), while among dental students: family (20.9%), studies (19.8%) and the Internet (19.2%). Medical students more often declared reading medical journals as source of knowledge in comparison to dental students (7.8% vs 3.4%).



**Figure 6.** Students who chose all groups for which influenza vaccination is especially recommended according to Polish Immunization Programme.



**Figure 7.** Sources of knowledge about seasonal influenza and flu vaccination.

## 5. DISCUSSION

The findings of presented pilot study indicates that vaccination rate against seasonal influenza among healthcare students was nearly 16% in season 2017/2016. In addition, it appears to be higher than among Polish healthcare workers, among which the flu vaccine coverage is estimated to vary from about 6% [5] to 9.5% (according to *Seasonal influenza vaccination programme country profile: Poland. 2012–13 Season* published by ECDC). Similar findings in the scope of flu vaccine coverage among medical students were obtained in previous Polish studies, in which vaccination rate among future doctors was reported to be about 13.4% [6] to 15.2% [7].

In comparison, in general population the vaccination rate against influenza in Poland in 2016 was about 15 per 1000 among the group aged 15 to 64 years old due to National Institute of Public Health and Chief Sanitary Inspectorate. According to this publication „Vaccinations in Poland in 2016”, the vaccination rate against influenza differed according to age and voievodeship, and was the highest among adults older than 65 years with nearly 70 vaccinated per 1000. However, although the vaccine coverage was the highest among this group, it is far below recommended target level.

Recently published studies in majority have concentrated solely on the group of medical students, with only few research suggesting, that there are differences in flu vaccination coverage among healthcare students according to the discipline. Presented study failed to prove such difference between medical and dental students. In contrast, Blank et al. results revealed that vaccination rate among medical students in the United Kingdom was 8.1%, while among future dentists was 0% [8]. However, several studies have shown, that this discrepancy has been observed for the group of healthcare professionals, indicating that physicians get vaccinated against seasonal flu more frequently than other HCWs, including nurses [9-11], or dentists [12].

The results demonstrated that although the knowledge of recommendations was good among students, it does not correspond with compliance with them. This problem has been highlighted previously, for instance Machowicz et al. also observed that the number of medical students undergoing influenza vaccination was much lower than those knowing that they should [8]. In addition, a study conducted by Betsch and Wicker indicates, that the recommendation for seasonal influenza vaccination was weaker predictor for vaccination intention than perceived own risk of contracting influenza [13]. These findings suggest that educational programmes should concentrate on elevating awareness of risk connected with influenza and influenza-related complications among healthcare students and their possible role in viruses' spreading, as well as dealing with misconceptions about flu vaccination.

Recommended vaccines might be perceived as less important than obligatory vaccines. This concerns also influenza vaccination, and might partially explain the problem of low vaccination rate in community. A study conducted by Kalinowski et al. showed that 42% of adults below 26 years never have been immunised with recommended vaccines, and among this age group those who get recommended vaccines regularly were only 5% [14]. The same study showed that false information and myths about influenza vaccine are still present, as 13.3% of adults below 26 years old, and 45.4% older than 26, thought that influenza vaccine may be the cause of influenza [14]. Misconceptions about flu vaccine in conjunction with underestimated possible consequences of influenza infection may affect students' attitudes toward vaccination and recommendations.

Therefore, thorough sources of information about influenza and influenza vaccination are essential. The results of presented study demonstrated, that there were gaps in students' knowledge of groups for which influenza vaccination is especially recommended due to clinical condition or epidemiological reasons. This could result from the fact, that study group consisted of students during first year of their clinical training. Presumably, stage of medical education and advanced level, may be related to better knowledge of these groups. However, not only classes during studies, but also the Internet are the main sources of knowledge about influenza and its vaccination among students. The effectiveness of web-based strategy in improving the intention to get vaccinated among medical students was described by Mena et al., with the focus on interactive online promotional campaigns promoting influenza vaccination of healthcare workers [15]. Similarly to presented findings, the role of family and family doctors, as sources of knowledge and possible motivating factors were described also by Stasiak et al. [16]. Presented findings may suggest directions in which activities for promoting regular vaccination against influenza and education programmes should concentrate, and most effective strategies and tools for improving vaccination rate among healthcare students. Educational activities should emphasize the benefits of regular vaccination among healthcare workers and deal with myths and misconceptions connected with influenza vaccination, which may negatively affect the decision of vaccination among students. Basic knowledge of influenza and influenza vaccination and awareness of possible consequences of infection seem to be crucial, and may influence and shape attitudes toward influenza vaccination among healthcare students.

## 6. CONCLUSIONS

- 1) Knowledge of recommendations for influenza vaccination among healthcare students is rather good, there are some differences according to the type of faculty.
- 2) However, knowledge does not correspond with compliance with recommendations among healthcare students, as the vaccination rate against influenza in study group is low (13.92% -15.82%).
- 3) Identification of gaps in students' knowledge and differences according to faculty, may suggest directions and strategies for promotion of regular vaccination against seasonal influenza among medical and dental students.

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