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## **Parents' knowledge and attitudes of children treated at the University Children's Hospital in Lublin towards influenza vaccination.**

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## ABSTRACT

**Introduction:** In recent times, there is an intense debate on the merits of the use of vaccination and post-vaccination complications among Poles. Vaccination against influenza is recommended in Poland. Many of the opponents use arguments, which are not scientifically substantiated but widely widespread. Statistics show that the percentage of Poles who decide on vaccination, continues to decline.

**Aim:** The aim of this work is to evaluate level of knowledge about influenza vaccinations among parents of children treated in University Children's Hospital of Lublin.

**Material and methods:** There were 90 participants who filled surveys prepared by the authors of the study. Data analysis was performed using STATISTICA 12.5.

**Results:** The observed percentage of parents who do vaccinate their children was low - only 17.8%. The main reasons for the resignation are: fear of adverse side effects (53.3%) and financial reasons (15.6%). Nearly half of parents believe that a healthy diet and daily doses of vitamin C to prevent flu and points to the effectiveness of antibiotics in the treatment of influenza. 14.4% believe that the influenza is the same as cold. Over 30% say that regular vaccination weakens our immune system. Most frequently chosen sources of knowledge, from which parents derive knowledge about influenza vaccination, are: Internet (64.4%), doctor (42.2%) and TV (32.2%).

**Conclusions:** Most participants in the study presents a relatively low level of knowledge about influenza vaccination, and most of them are aware of the seriousness of this disease. The lack of knowledge about the basic facts about vaccination, may be the cause of the low percentage of vaccinated children. A large part of the parents renounces vaccination due to financial problems.

**Key words:** MeSH: Influenza Human, Vaccination, Attitude

## Introduction

Influenza is an acute viral respiratory infection caused by the virus from the Orthomyxoviridae family. So far, three serotypes of this virus have been distinguished: A, B and C. Type A most frequently causes epidemics and pandemics due to the ability to undergo antigenic shifts, while the B and C types use the so-called mechanism of antigenic drift. For this reason, the virus is able to quickly change the protein structure of its envelope, so that the immune system of people who have already been infected with the influenza cannot recognize a new strain of the virus as a threat. In the northern hemisphere, influenza epidemics are recorded at the highest frequency from October to April [1].

Influenza is a droplet infection – it takes place during coughing, sneezing, talking and as a result of direct contact with fresh secretions from the respiratory tract of infected people. The disease is manifested primarily with a dry cough, sore throat, accompanied by high fever, chills, muscle pain, headache and poor general well-being [1]. In small children the clinical picture is usually uncharacteristic - infection may be suggested by changed behavior, drowsiness or irritability,

lack of appetite and vomiting [1]. Among the most common complications of influenza are pneumonia and streptococcal angina, however, this disease can also lead to more serious complications - sepsis, myocarditis, pericarditis, encephalitis and meningitis. Complications are more common in children under the age of 2, adults over the age of 65, pregnant women and people suffering from chronic diseases. The WHO estimates that influenza can affect 5% -10% adults and 20% -30% children per year [1], and 3-5 million people around the world experience severe complications. The seasonal influenza mortality rate is 0.1% -0.5% (1-5 people die for 1,000 cases of influenza) [2].

Treatment of influenza is primarily symptomatic, and antibiotics are ineffective. There is a small range of antiviral drugs effective against influenza (oseltamivir, zanamivir, amantadine and rimantadine) and they are not routinely administered, but only with confirmed diagnosis of severe influenza or concomitant complications and in risk groups. However, the most effective method of preventing influenza is prophylactic annual vaccination and for that reason, awareness of the public about prevention and methods of its treatment of this disease is extremely important. The vaccine contains WHO recommended fragments of surface proteins of 3 strains of the virus, which are most likely to occur in particular season. In Poland, influenza virus vaccines belong to the recommended group and are addressed to all people over 6 months of age, and in particular to healthy children from 6 months to 18 years of age. Due to the huge variability of the virus genome, it is necessary to revaccinate each year, to protect against new strains.

### **Aim of the research**

The aim of this study was to assess the level of knowledge about influenza vaccination and to determine the sources of knowledge most often used by parents of children treated at the University Children's Hospital in Lublin.

### **Material and methods**

The study was conducted among randomly selected parents of children treated in the clinic of the Children's University Hospital in Lublin on randomly selected days of April and May 2015. Participation in the study was voluntary and anonymous. The study group consisted of 90 parents, of whom 84.4% were women and 15.6% men. In the age group of 20-30 years there was 33.3% of the surveyed, 30-40 years - 44.4%, 40-50 years - 17.8%, and 4.4% in the group over 50 years of age. The level of education of the respondents was as follows: 6.7% basic education, 15.6% - vocational education, 33.3% - medium, 44.4% - higher education. The study

used the method of a diagnostic survey using a questionnaire constructed by the authors. The questionnaire contained 16 questions and consisted of two parts. The first part allowed obtaining socio-demographic data (age and sex of the participant, level of education, number of children). The second part concerned parents' knowledge about influenza, sources of information on vaccinations and parents' attitudes and factors influencing the decision to vaccinate or abandon it. The questionnaire contained closed - alternative, disjunctive and conjunctive questions. The obtained results were statistically analyzed using the STATISTICA 12.5 program. The significance of intergroup differences was verified with Pearson chi-square test. The results of the survey are described depending on the sex, age and level of parents' education. The analysis of the collected data is the basis for further conclusions.

## RESULTS

One of the most important and disturbing information that was obtained during the analysis is the percentage of parents who did not decide to vaccinate their children against influenza – 82.2% of the respondents. While asked to indicate the most important reasons for this decision they gave the following answers: fear of undesirable side effects (53.3%), the view that influenza vaccination is the result of collusion of pharmaceutical companies (15.6%), financial reasons (13.3%), lack of faith in the effectiveness of vaccination (11.1%). None of the respondents indicated the presence of mercury in the vaccine as the reason for resignation from vaccinations.

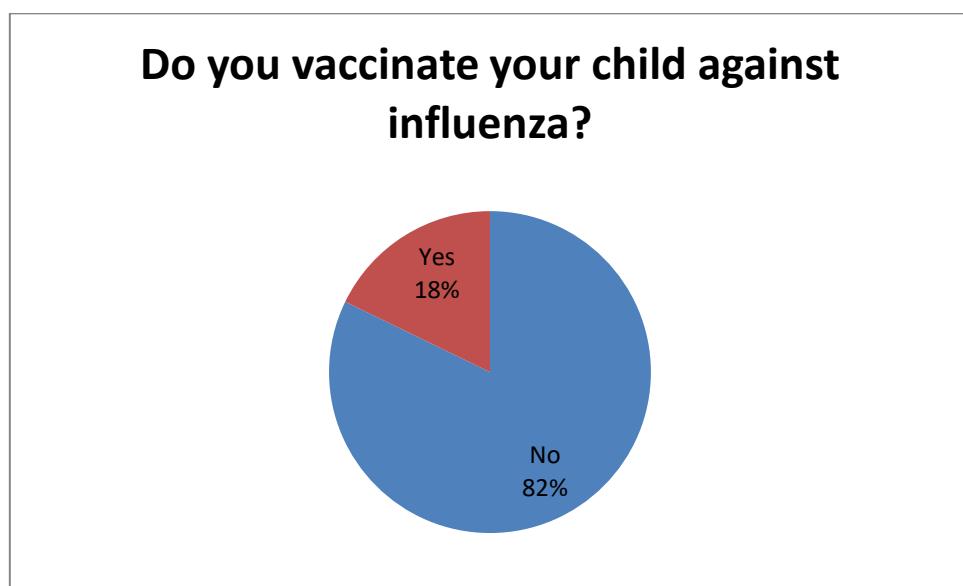


Figure 1. Percentage of parents vaccinating children against influenza.

Unwanted side effects	53,3%
Vaccination against influenza caused by the collusion of pharmaceutical companies	15,6%
Financial reasons	13,3%
The will to avoid repeated punctures of the child's skin	3,3%
Ineffectiveness of the vaccine	11,1%
Addition of mercury	0,0%
Medical contraindications	8,9%

Table 1. Reasons for resignation from vaccinating children against influenza.

In questions about basic information about the disease, it was proven that 81.1% of respondents described influenza as a serious disease that can lead to permanent complications, while 14.4% of them think that it has only features of common cold. Interestingly, mothers were more likely to consider influenza as a serious disease (82.9%) or even fatal (5.3%), while fathers more often believed that influenza is a type of cold (28.6%). Statistical analysis showed a significant relationship between education and the assessment of severity of the disease ( $p = 0.007$ ). Respondents presenting higher or secondary education more often evaluated influenza as a serious disease (85% and 86.67% respectively) than people with basic education (33.3%).

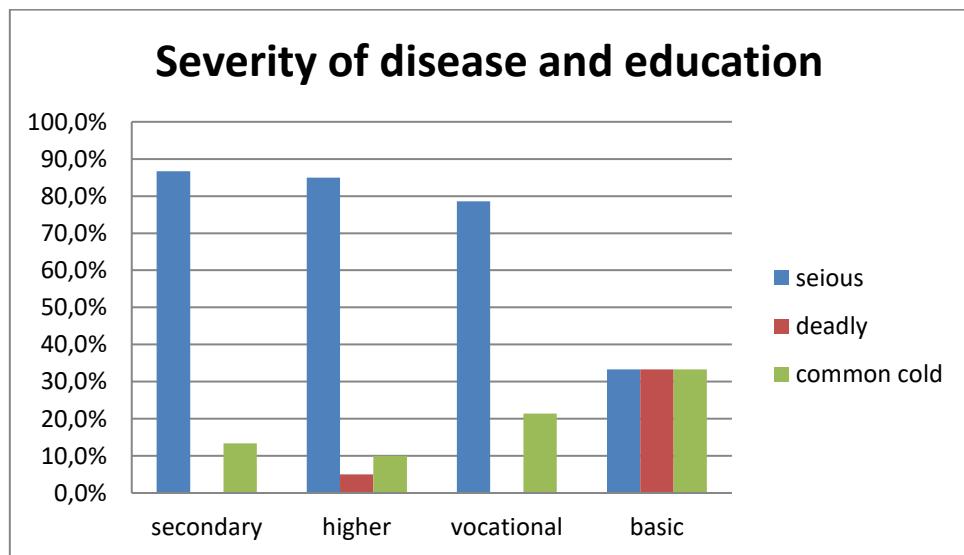


Figure 2. Parents' opinion about the severity of the disease by education.

Another aspect of knowledge about influenza was the assessment of the "formal status" of vaccination against this disease. 88.9% of parents responded that influenza vaccination belongs to the group of recommended vaccinations, with a significant correlation ( $p = 0.00011$ ) between the level of education and correctness of response - 95% of people with higher education and 93.3% of people with secondary education, in relation to 33.3% of people with primary education. What is more, 22.2% of respondents answered that influenza vaccination also involves immunity against the so-called "stomach flu". One third of parents claimed that regular vaccination has a negative impact on organism immunity. Also in this aspect, a significant relationship between education and the opinion on the impact of immunization on the immune system can be observed ( $p = 0.02$ ) - 66.7% of people with primary education and 57.1% of people with vocational education stated that regular vaccination weakens immune system, and 66.7% with secondary education and 80% of people with higher education were opposed to this opinion.

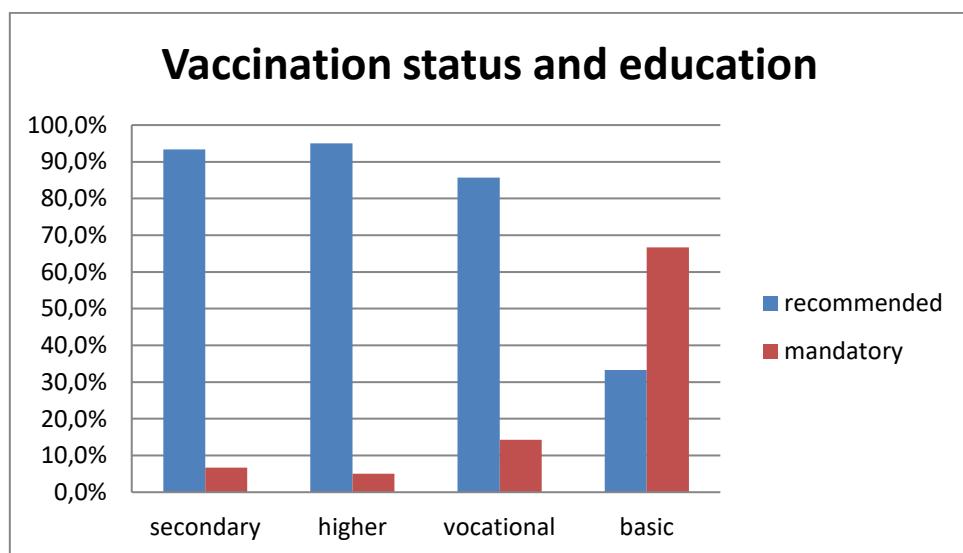


Figure 3. Parents' opinion on the "formal status" of influenza vaccination (recommended / obligatory) by education.

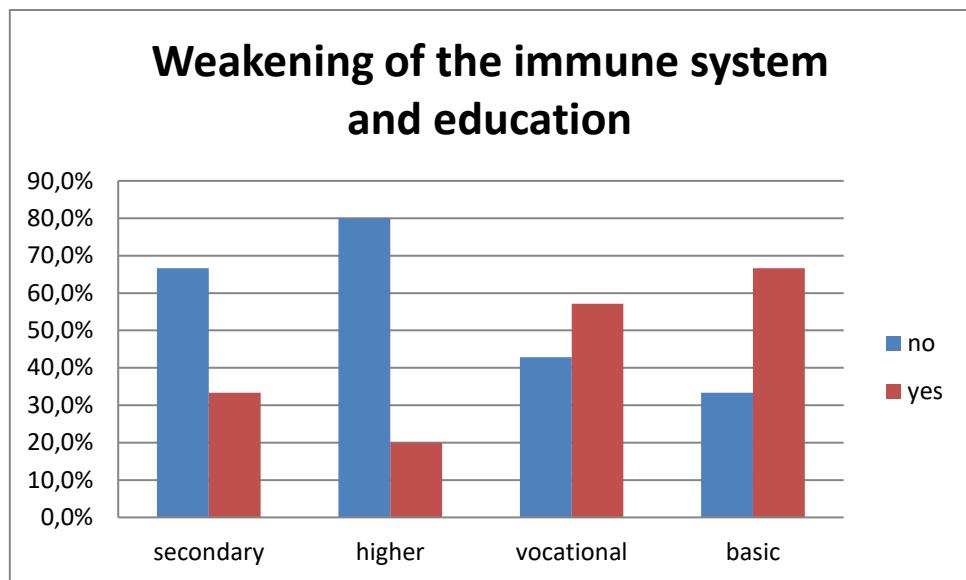


Figure 4. Parents' opinion on the impact of vaccination on immune system functions by education.

In the question about the persistence of postvaccinal immunity, 47.8% gave a correct response (6-12 months), 36.7% - from 3 to 6 months, 7.8% - 1-5 years, 4.4% - 1-3 months, 3.3% thought that after vaccination it would not produce immunity. 71% of parents were aware it have to be held once every six months, and 4.4% - every 5 years. In the question about the knowledge of the market price of a single dose: 44.4% of them estimated it at level of 30-50 PLN, 27.8% at 50-80 PLN, 7.8% at 80-100 PLN, and 20% the respondents admitted that they were never interested in this issue.

A block of questions about prevention and treatment has led to further important information: 48.9% of parents believed that a healthy diet and daily doses of vitamin C are an effective way to prevent influenza. 45.6% of respondents questioned whether antibiotics are effective in treating influenza, answered affirmative, while in the group of people with primary education this percentage was 100%.

In the multiple choice question about sources of knowledge from which parents gather information about influenza vaccinations, the most popular were: Internet (64.4%), doctor (42.2%), television (32.2%), leaflets and posters in outpatient clinics (27.8%) and acquaintances (27.8%). The Internet was more willingly chosen source for people with vocational (100%), higher and secondary (60%) education than in the group with basic education (33.3%). The doctor was a source of knowledge about influenza vaccination for 65% of people with higher education, while it was relatively rarely indicated by people with secondary education (33.3%), vocational (14.3%) and primary education (0%).

Sources %	Use	Not use
Literature	20,0	80,0
Magazines for mothers	3,3	96,7
Internet	64,4	35,6
School	6,7	93,3
Leaflets, posters	27,8	72,2
Doctor	42,2	57,8
Friends	27,8	72,2
TV	32,2	67,8

Table 2. Sources of knowledge about influenza vaccination.

## Discussion

In summary, in the group of respondents, the most common reasons for abandoning vaccinations were: fear of adverse post vaccination reactions, costs of vaccination, conviction about the "plot" of vaccine manufacturers and lack of faith in the effectiveness of vaccination. Moreover, in the Pomian-Osiak et al. study, parents did not choose recommended vaccinations for their children for similar reasons - above all the high cost, the number of recommended vaccines available, as well as the alleged ineffectiveness of vaccinations [3]. In turn, according to Szynczewska, the main reason for the resignation from vaccinations were the lack of sufficient knowledge on the subject (54.1%) and fear of post-vaccination complications [4]. In other studies involving students, the most important reason for departing vaccinations were the conviction of good health, fear of becoming ill as a result of vaccination, while financial reasons were rarely given [5]. The main arguments for giving up vaccinations among the students of the University of the Third Age were the lack of faith in the effectiveness of vaccinations (25%) and fear of adverse effects (20%), as well as financial barriers (13%) [6].

Our research has shown that knowledge about flu treatment is insufficient. Almost half of parents surveyed considered antibiotics to be effective in treating influenza, as well as healthy eating and regular intake of vitamin C in preventing the disease. Similar results were obtained in other studies conducted among first-year students, one-third of them considered using antibiotics to treat influenza as an effective way fight infection [5]. In turn, according to 49% of respondents (students of the University of the Third Age), the best prophylaxis are home-

made methods, eg consumption of garlic and onions, and only 15% noticed the benefits of vaccine prophylaxis [6]. Interestingly, as many as every third respondent in our research was convinced that regular vaccination contributes to the weakening of the immune system.

The study also showed that the level of knowledge of parents with higher education is significantly greater than that of parents with primary or vocational education. This relationship is observed both in the group of mothers and fathers. This is also confirmed by the studies of Kochman et al. who emphasize the particularly significant impact of higher education of mothers on the decision to vaccinate children with additional vaccines [7]. Let us add that in the same study was no significant influence of the age of parents on the decision concerning vaccination [7].

Another important conclusion coming from the undertaken research is the alarmingly low percentage of parents deciding to vaccinate their children against influenza - they constituted only 17.8% of the respondents. A similar percentage (15.4%) was found in a study among seniors - students of the University of the Third Age conducted by Woźniak-Kosek et al. [6]. Therefor, in the study assessing the knowledge and attitude to vaccination against influenza among students of the first year, it was found that 67% of respondents never vaccinated against influenza [5]. The study by Gyrczuk et al. describes the phenomenon of one hundred percent of the population of nursing home vaccinated every year [8], which is due to the fact that it is one of the risk groups for serious complications and that the decision is taken by director of the facility [8]. To sum up, the conclusion of these research papers is that the percentage of people immunized against influenza virus is far too low to achieve population resistance, which would protect not only those vaccinated, but also those who could not or did not want to be vaccinated. At the end of this synthetic summary of the most important conclusions from the research, let us mention that only 16% of men were in the group of people who took part in the study, probably due to the reluctance of children's fathers to participate in the survey (more frequent refusals from their group), and on the other hand, the probable fact that women more often go to visit the doctor with their children.

Trying to conclude, it should be emphasized that our research seems to raise a significant socio-health problem. Well, recently the problem of parents' reluctance to use vaccinations is clearly increasing. There is a lively debate among Poles about reactions and post-vaccination complications, which are a frequent factor in resignation from vaccinating children. Statistics show that the percentage of Poles who decide to vaccinate is constantly decreasing: in the autumn and winter season 2009/2010, the percentage of people vaccinating against influenza

was 6.8%, in the 2010/2011 season - 5.2%, in 2011 / 2012 - 4.5%, and in 2012/2013 only 3.8% [9].

Meanwhile, influenza is a disease that affects large groups every year, often leading to serious complications and deaths [10,11]. The cost of running vaccinations against influenza is realistically lower than the costs of treatment of influenza and its complications [12]. Based on the financial analyzes carried out in many countries, the conclusion was drawn that the cost of vaccination on a large scale is two to even four times lower than the costs incurred for treatment [13]. According to the WHO recommendations, about 70% of the population should be vaccinated to obtain population resistance [14]. A notable increase in the percentage of children vaccinated against influenza coincides with pandemic influenza periods (eg pandemics caused by the AH1N1 virus in 2009), which is publicized by the media. Universal access to information and the promotion of vaccination promotes pro-health behavior and the use of prophylaxis. Such information campaigns are an extremely important element in the education of parents of children and have a considerable impact on the dissemination of the benefits of prevention [15]. In Poland, influenza vaccination was included in the recommended calendar of vaccinations in 1994 [16]. Placing them in the calendar of mandatory vaccinations seems unlikely due to the significant costs of refunding the annual vaccinations of such a large population. For this reason, the need to conduct extensive preventive actions, encouraging parents to vaccinate their children against influenza on their own, becomes particularly evident. It should be emphasized in this context that children are included in the group of high risk of developing post-influenza complications. It is worth noting that it would be necessary to widen the areas of conducting such awareness campaigns and not concentrate solely on the so-called traditional means of communication. As most studies show, the doctor is the most frequent source of information on recommended vaccinations [17,18,19], but there is also an increasing share of the Internet in parent education (which we mentioned in our research). The Internet is a convenient, easy and low-time-consuming source of knowledge on health issues, but on the other hand it should be remembered that it may have little credibility - it is a "place" where information based on evidence-based medicine coincides with unverified opinions of people not related to health service [20,21]. In addition, it is a field willingly used to popularize the views of the so-called the anti-vaccine movement, which according to many experts presents the often adulterated impact of vaccination on human health, and thus suggests to abandon mandatory and additional vaccinations [22,23,24]. Due to this "information turmoil", it is particularly important to take reliable information campaigns, an example of which is the joint initiative of the National Institute of Public Health - National Institute of Hygiene and the Polish Society of Vaccinology,

which created the portal [www.szczepienia.info](http://www.szczepienia.info), presenting current, reliable and objective information on vaccination.

## **Conclusions**

1. The percentage of children vaccinated against influenza differs significantly from the level ensuring population resistance.
2. The decision of the respondents not to apply vaccinations to their children was most affected by the fear of unwanted side effects, the view that influenza vaccination is the result of collusion of pharmaceutical companies and financial reasons.
3. People with secondary and higher education presented a significantly higher level of knowledge about influenza vaccination than people with primary education.
4. Parents used the Internet most often to obtain information about vaccinations.
5. There is a need for greater activation of health services (doctors, nurses) to disseminate information on influenza and the effectiveness of vaccination.

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