ORIGINAL ARTICLE

Monitoring of effectiveness of some preventive measures against influenza

Sledovanie účinnosti niektorých preventívnych opatrení proti chrípke

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Summary

In our study we dealt with the frequently occurring influenza virus that infects humans regardless of age or sex. The flu is not of importance only in health problems but also in the economic ones, such as the treatment costs and patients' ability to work. We focused particularly on the most effective preventive measure against the virus, which is vaccination and the risk groups that are the most vulnerable ones to the virus. One of the objectives of this research was to identify the advantages and disadvantages of vaccination against influenza and available risks of vaccination within a group of 390 patients. We studied a group of 195 vaccinated patients and we tried to determine the effect of the vaccines used in these patients, and to compare this group with the same number of unvaccinated patients. The goal of the research was to identify the advantages and disadvantages of the vaccination against influenza, and the potential risks resulting from the vaccination. Based on our results, we found out that out of 195 vaccinated patients, only 4% returned to the doctor with the flu. Unvaccinated patients, however, visited the doctor four times more frequently, regardless of age. The resulting morbidity ratios clearly showed the importance, effectiveness and safety of the vaccination not only in high-risk groups, but also in people that are "out-of-danger", because the current flu virus spreads by droplet infection very quickly. Appropriate education and increased awareness among the population in Slovakia could improve the general attitude towards the vaccination against influenza and the vaccination rate (Slovakia 12%) could raise to a percentage comparable to that of the EU countries (France 30%, England 32%, the Netherlands 28% and Germany 26%).

Keywords: influenza • preventive measures • vaccination • effectiveness of vaccination

Súhrn

V našej práci sme sa zaoberali s často sa vyskytujúcim vírusom chrípky, ktorý napáda ľudstvo bez ohľadu na vek alebo pohlavie. Z toho vyplývajú nielen zdravotné, ale aj ekonomické problémy, ako sú náklady na liečbu a práceschopnosť pacientov. Zamerali sme sa najmä na spôsoby prevencie proti tomuto vírusu, na vakcináciu a rizikové skupiny obyvateľov, ktoré sú ním najviac ohrozené. Študovali sme súbor 195 zaočkovaných pacientov a snažili sme sa zistiť účinok očkovacích látok, ktoré im boli aplikované a porovnať túto skupinu s rovnakým množstvom nezaočkovaných pacientov. Jedným z cieľov našej práce bolo zistiť výhody a nevýhody očkovania, prípadne riziká, ktoré z očkovania proti chrípke pre pacientov vyplývajú. Na základe našich výsledkov sme zistili, že zo 195 zaočkovaných pacientov sa k lekárovi vrátilo s chrípkou 4 %. Návšteva lekára pacientmi, ktorí očkovanie odmietli, bola štvornásobne vyššia bez ohľadu na pohlavie. Výsledné pomery chorobnosti jednoznačne poukázali na dôležitosť, efektívnosť a bezpečnosť očkovania nielen u rizikových skupín, ale aj u ľudí „mimo ohrozenia", pretože vírus chrípky sa v súčasnosti šíri kvapôčkovou infekciou veľmi rýchlo. Vhodnou edukáciou a informovanosťou obyvateľstva na Slovensku by mohol byť postoj k očkovaniu pozitívne ovplyvnený a zaočkovanosť (Slovensko 12%) by sa môhla zvýšiť na hodnoty porovnateľné so štátmi Európskej únie (Francúzsko 30%, Anglicko 32%, Holandsko 28% a Nemecko 26%).

Kľúčové slová: chrípka • preventívne opatrenia • vakcinácia • efekt vakcinácie

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Introduction

Influenza is one of the most frequent contemporary diseases. It may be one of the causes of increased morbidity and mortality. Vaccination remains the most important means of preventing and controlling it. A review of the published literature shows that vaccination of children, healthy younger adults, the elderly, and both children and adults with high-risk medical conditions provide substantial benefits, although the types of benefits vary by age. Vaccination also generally provides benefit even during poor match seasons. Strategies to reduce transmission within households and communities through vaccination of school children and to reduce transmission within health care settings by vaccinating the healthcare employees are also promising[1]. Nearly one third of the population gets infected by this disease on a yearly basis. In many cases it is manifested as an uncomfortable feeling that disappears within a week or two with the help of treatment. Influenza is caused by the viruses from the Influenzaviridae genus of the Orthomyxoviridae family. Rhinoviruses and coronaviruses are the most common causes. Less frequent are also adenoviruses and enteroviruses. The most common types of Influenza are A and B types. The virus of Influenza type C has different characteristics from the types mentioned and we classify it into a separate genus. Natural hosts of Influenza type A viruses are humans and various animals. On the other hand, only humans are susceptible to the viruses of Influenza types B and C. The Influenza viruses are quite resistant to the influence of the environment. They are found in secrets and dried mucus drops[2–4]. Most previous studies on influenza and influenza-related clinical complications have focused on hospitalisation rates in relation to influenza epidemics[5]. Relatively little research has been done using data from the primary care setting, although influenza is an infectious disease that is predominantly dealt with in primary care facilities. Community-based surveys have assessed influenza incidence rates and suggested that acute respiratory infections (bronchitis, pneumonia), otitis media, and heart failure are the most frequently observed clinical complications of influenza. The clinical course of such complications can be more severe in subjects with underlying chronic diseases of the respiratory tract or cardiovascular system[6]. Seasonal influenza appears each year in autumn and spreads until the beginning of spring, causing significant morbidity and mortality. The World Health Organization (WHO) estimates that there are 3–5 million cases worldwide each year, leading to 250,000–500,000 deaths[7]. Europe has 40,000–220,000 cases each season[8] and the Italian epidemiological and virological surveillance system Influnet registered a seasonal incidence of 5–20% in the general population[9, 10]. Public health policies aim to differentiate and concentrate coverage on those who are at greatest risk, commencing with people aged > 64 years[11]. Some previous cross-sectional studies investigated influenza vaccination inequalities according to geographical and socio-economic factors, as well as the presence of a chronic medical condition, in adult and elderly populations, but no studies have been undertaken in younger groups. In particular, there is evidence that lower educated subjects, manual workers and those who live in densely populated houses are at higher risk of not being vaccinated against influenza[12–15]. When it comes to patients' awareness about vaccination, the doctor and the media have a very important role. The pharmacist can equally contribute to the increase in patients' awareness by means of counselling. They can provide professional advice on the ways of preventive measures against influenza.

Experimental part

Methods

Our research was conducted in the Polyclinic in Nitra at GP for adults between September 2009 and February 2010 on a sample of 390 patients. The patients were divided into several groups, according to age, sex and vaccination coverage. Within each group, the patients were divided into subgroups with regards to sex, vaccination coverage and morbidity. Patients were divided into three age groups from 18–40 years, 41–65 years and 65 years and older. With the patients who were ill we monitored the method of their treatment: by means of antibiotics or OTCs so as to learn the economic benefits of vaccination. In our research we have not focused on obtaining information on the impact of the profession and lifestyle on the willingness and unwillingness of patients to be vaccinated. Similarly, we have not surveyed vaccinations of their families, either. We also took into account the number of vaccines used in Slovakia during two flu seasons in 2008/2009 and 2009/2010 and costs incurred by insurance companies to vaccination in Slovakia. The results were processed into five figures.

Result and discussion

In the influenza season 2009–2010 there were 1,706,554 acute respiratory infections, representing a morbidity of 52,481.9/100,000 inhabitants. Compared to the previous influenza season 2008/2009, the number of reported cases increased by 173,756, i.e. about 1.1%. The morbidity curve for acute respiratory infections, flu and influenza-like illnesses in the 2009/2010 season showed increasing characteristics as of the beginning of the 42nd calendar week. The curve reached the morbidity peak of the disease (2,740.8/100,000, which was caused by the pandemic influenza virus A (H1N1) 2009) in the 47th calendar week. Since the end of November the incidence of acute respiratory infections and influenza-like illnesses started to gradually decrease, and the morbidity curve began to copy the previous flu season, however, with significantly lower values since the beginning of 2010. In our research, we monitored the effectiveness of vaccination against influenza in the general practitioner's surgery in 390 patients. Out of these, 195 patients were vaccinated during September and October 2009. The other half refused to receive the vaccine. They were first divided according to age. The

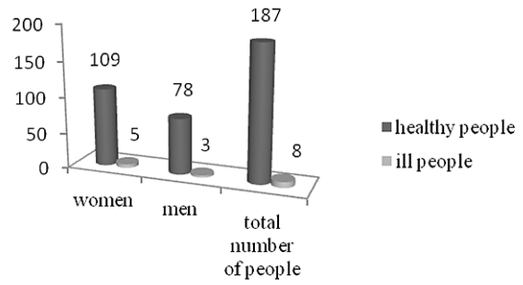

Fig. 1. Distribution of vaccinated patients according to sex and morbidity

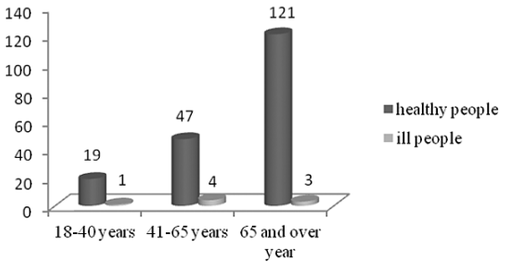

Fig. 3. Distribution of vaccinated patients according to their age

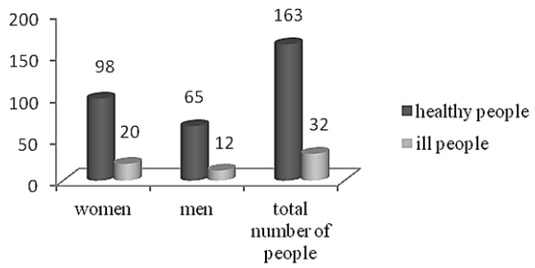

Fig. 2. Distribution of non-vaccinated patients according to sex and morbidity

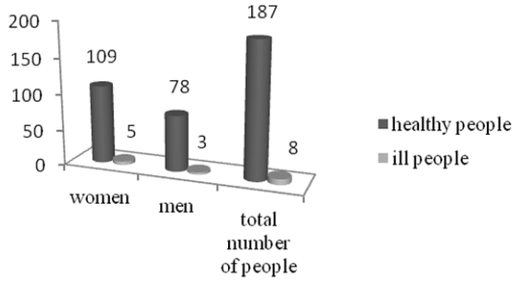

Fig. 4. Distribution of non-vaccinated patients according to sex and age

first group consisted of patients aged between 18 and 40, the second one consisted of patients aged 41 and 65 and the third group included all the patients aged over 65. The first group consisted of 20 vaccinated patients aged 18 to 40, who were compared to the control group of 114 non-vaccinated patients of the same age. Five patients from this group were vaccinated with Influvac and 15 patients with the vaccine Fluarix. The second group consisted of 51 vaccinated patients aged 41 to 65, who were compared to the control group of 68 non-vaccinated patients of the same age. Twenty-nine patients from this group were vaccinated by the Influvac vaccine, while 22 patients by the Fluarix vaccine. The last group had 124 vaccinated patients older than 65. They were compared to the control group of 13 non–vaccinated patients of the same age. Sixty-five patients from this group were vaccinated by the Influvac vaccine, while 59 patients by the Fluarix vaccine. We observed not only differences in age but also in sex and we assessed morbidity rate, i.e. the effectiveness of vaccine substances. At the same time we monitored the way of treatment, i.e. by antibiotics or OTC medicines, to find out the economic benefits of vaccination. In the first part of our experiment we were interested in the ratio of vaccinated patients in terms of their sex. The aim of this part was to find out possible differences in the vaccination rate considering the sex and the morbidity rate after vaccination. Out of 195 vaccinated patients, 114 were women and 81 were men, 3.7% men and 4.4% women returned to the doctor due to acute respiratory infections (ARI) (Fig. 1).

The non-vaccinated group consisted of 118 women and 77 men. From Figure 2 it implies that 15.6% of non-vaccinated men and 16.9% women returned to the doctor due to influenza or a similar disease, which represents 16.4% of the total number of non-vaccinated patients.

In the following part of our research we sought to find out the differences in vaccination coverage with regard to the age and the consequent morbidity rate within the following groups. Both vaccinated and non-vaccinated patients were divided into three age categories. Figure 3 implies that 5% of patients aged 18 to 40 returned to the doctor with influenza or a similar disease, 7.8% of vaccinated patients aged 41 to 65 and 2.4% of patients aged over 65 reported to have ARI.

We were equally interested in the ratio of non-vaccinated patients with regard to their age. The aim was to find out possible differences in the ratio of vaccination coverage among patients with regard to their age. Figure 4 implies that 20.2% of patients aged between 18 and 40 returned to the doctor with influenza or a disease similar to influenza; 8.8% of patients aged 41 to 65 and 23.1% of patients aged over 65 reported to suffer from experience influenza.

In our research we tried to find out the costs of treatment of the vaccinated patients and non-vaccinated patients who suffered from ARI and who were treated either by means of antibiotics or OTCs. 3.6% of the patients vaccinated were treated with antibiotics and 0.51% with OTC medicines. Of the non–vaccinated patients, 13.8% were treated with antibiotics and 2.6% with OTC medicines. Treatment with antibiotics cost a health insurance company € 6.20 on average per one patient. The average patients' supplemental payment was € 2.80 and with certain medicines even more [16]. The health insurance fully paid the influenza vaccine for all patients who wanted to be vaccinated regardless of age. By comparing the vaccination coverage between the two flu seasons (2008/2009 and 2009/2010) we found out that the total number of vaccines used decreased by 3.3% as implied by Figure 5. The most frequently used

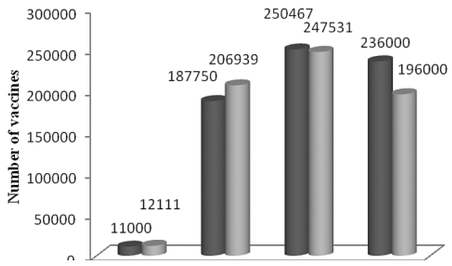

Fig. 5. Comparison of influenza vaccination usage between the flu seasons 2008/2009 and 2009/2010

vaccines in 2008/2009 season were Influvac (36.6%), Vaxigrip (34.4%), Fluarix (27.4%) and Begrivac (1.6%) of all the vaccines used. The most commonly used vaccines in the season 2009/2010 were Influvac (37.4%), Fluarix (31.2%), Vaxigrip (29.6%) and Begrivac (1.8%) of all the vaccines used[16].

Conclusion

In the influenza season 2009/2010, health insurance companies paid about 4,4 mil. € for vaccination against the flu. Of the health insurance companies, Všeobecná zdravotná poisťovňa paid the highest number of doses of vaccines against influenza (434 046), followed by Dôvera (135 858) and Union (28 756). Total insurance paid 598 660 vaccines. The most used vaccine was Influvac[16]. Out of our selected group of patients, 99 were vaccinated by the Influvac vaccine, while 96 by the Fluarix vaccine. Health insurance companies cost for vaccination of these patients is approximately € 1,450. Out of 195 vaccinated patients, only 4% reported to suffer from the flu or a disease similar to the flu. The morbidity rate among the patients who refused to be vaccinated was four times higher regardless of sex. Despite the accomplished results, people increasingly did not trust vaccines against the flu. Many think that their own immune system is strong enough to resist the viruses or they have fear of potential side effects. The development process of a vaccine takes 10 to 15 years during which time it is repeatedly tested enough times to be considered absolutely safe. In many cases influenza causes only uncomfortable feeling in the patient. However, sometimes the untreated flu can have fatal consequences for the patient. The Slovak Republic still lags behind the developed EU countries regarding the number of patients vaccinated against the flu. We must hope that the ratio of patients vaccinated will soon start increasing rather than decreasing.

Conflicts of interest: none.

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