

# THE IMPACT OF PATIENT'S SOCIO-DEMOGRAPHIC CHARACTERISTICS, COMORBIDITIES AND ATTITUDES ON FLU VACCINATION UPTAKE IN FAMILY PRACTICE SETTINGS

## VPLIV BOLNIKOVIH PSIHOSOCIALNIH ZNAČILNOSTI, KOMORBIDNOSTI IN STALIŠČ NA ODLOČITEV O CEPLJENJU PROTI GRIPI V AMBULANTAH DRUŽINSKE MEDICINE

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### ABSTRACT

#### Keywords:

vaccination, influenza, family practice, attitudes, chronic diseases

**Objectives.** In Slovenia, the role of family physicians in primary care and preventive procedures is very important. Influenza vaccination rates in Slovenia are low. The reasons for low vaccination rates in Slovenia were not clear. We suppose that patient's beliefs and attitudes are important factors. We assessed patients' opinions regarding the acceptance of flu vaccination by their family physicians and their beliefs and attitudes about flu and vaccination. The aim was to check out factors that influence the decision to take the vaccine in family physician offices.

**Methods.** This was a cross-sectional, multicenter, observational study in the Styria region in Slovenia. We included patients from seven family physicians during regular office visits. They filled in a questionnaire about their general demographic data and attitudes regarding influenza and vaccination. The main outcome was the decision to be vaccinated.

**Results.** The logistic regression model identified five predictors for influenza vaccination, namely: heart disease, previous vaccination, an agreement with the beliefs 'the vaccination is an efficient measure to prevent influenza', 'after the vaccination there are usually no important side effects' and 'the vaccination is also recommended for a healthy adult person'. The belief that vaccinations harm the immune system is negatively associated with vaccination.

**Conclusions.** Patients' beliefs are an important factor to decide for vaccination or not. Family physician teams should discuss with patients their beliefs and concerns about vaccination.

### IZVLEČEK

#### Ključne besede:

cepljenje, gripa, družinska medicina, stališča, kronične bolezni

**Uvod.** V Sloveniji ima zdravnik družinske medicine pomembno vlogo pri izvajanju preventivne. Delež cepljenih proti gripi je v Sloveniji nizek. Razlogi za to niso povsem jasni. Preučevali smo mnenje bolnikov glede cepljenja proti gripi pri njihovem družinskem zdravniku ter njihova stališča in prepričanja o gripi in cepljenju. Cilj naloge je bil odkriti dejavnike, ki vplivajo na odločitev o cepljenju v ambulantni družinske medicine.

**Metode.** Raziskava je bila presečna multicentrična opazovalna. Vključili smo bolnike iz 7 ambulant družinske medicine na Štajerskem v Sloveniji. Vzorec je zajemal bolnike, ki so prišli v ambulantno. Izpolnili so vprašalnik z demografskimi podatki ter stališči o gripi in cepljenju. Glavni opazovani dogodek je bil odločitev za cepljenje.

**Rezultati.** V logističnem regresijskem modelu so bili najpomembnejši napovedni dejavniki odločitve za cepljenje srčna bolezen, cepljenje v preteklosti, strinjanje, da je cepljenje najbolj učinkovit ukrep proti gripi, strinjanje, da cepljenje običajno nima pomembnih stranskih učinkov, in strinjanje, da je cepljenje priporočljivo tudi za odraslo zdravo osebo. Prepričanje, da cepljenje škodi imunskemu sistemu, je negativni napovedni dejavnik odločitve za cepljenje.

**Zaključki.** Stališča bolnikov so pomemben dejavnik pri odločitvi za cepljenje. V ambulantah družinske medicine bi se morali z bolniki več pogovarjati o njihovih stališčih in pomislekih o cepljenju.

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## 1 INTRODUCTION

Influenza is still an important acute infectious disease. It increases morbidity and mortality during winter every year, especially during pandemic influenza. Adults older than 75 years are at the highest risk for mortality. The mortality risk is higher when circulatory and respiratory diseases are present, and also underlying cancer, diabetes, renal disease and Alzheimer disease have a contribution (1). Influenza vaccination has been shown to be cost-effective in reducing morbidity and mortality in the older adult population and in decreasing morbidity, lost work days and the use of health care resources (2). The studies of working age groups reported reductions of 34%-44% in physician visits, 25% in antibiotic use for influenza-associated illnesses, and 32-45% in lost workdays for those vaccinated (2, 3). Estimated costs among healthy persons aged 18-64 years were calculated between \$60 and \$4000 per illness (4).

There are huge differences in seasonal flu vaccination rates between different countries and regions, and there are also differences every year (5-8). The decision to be vaccinated against seasonal influenza depends on different factors. A higher age, chronic health conditions and previous hospitalizations are important predictors of flu vaccination (5, 9). In addition, socio-demographic characteristics, cultural differences, economic status and education level are important in the decision-making process (10, 11). Patients' beliefs regarding influenza infection, a perceived influenza risk, vaccine effectiveness, and likelihood of vaccine side effects, as well as a confidence in a good health status and distrust of modern medicine are important predictors regardless of age, job or socioeconomic status (9). Influenza vaccine uptake in the previous years was one of most important predictors (10). In addition, being married, drinking alcohol, smoking and engaging in regular exercise are all factors associated with flu vaccination uptake (11). Also, media coverage of vaccine-related issues, social group norms about health behavior and peer group influences may play a role (12, 13). Many studies found an important role of physicians. Physicians' recommendations are usually important facilitators for vaccine uptake. On the other hand, low vaccination rates can also be explained by physicians' failure to strongly recommend influenza vaccination to their elderly and high risk patients (14).

In Slovenia, the National Institute of Public Health every year publishes a vaccination program and practical recommendations, including seasonal flu vaccination (15, 16). According to this program, the vaccination against seasonal influenza is recommended for children, for elderly people aged 65 years or more, for pregnant women and for patients with chronic health conditions. Flu vaccination is also recommended for people who are

at a high risk of influenza because of their job (e.g. health care workers, veterinaries, workers in chicken farms...) and for students who work in health institutions during flu season. Nevertheless, the adherence to vaccination varies widely.

In Slovenia, people have an opportunity to be vaccinated in primary health centers by their family physicians, or in regional departments of the National Institute of Public Health. The service of vaccination and flu vaccine is not covered by national health insurance. Only vaccines for patients in risk groups are paid by national health insurance. The cost of flu vaccination, however, is very low, especially for elderly people and patients with chronic illnesses. Some companies also decide to offer free flu vaccination to their workers by a vaccination team that comes to them. Despite that, flu vaccination rate in Slovenia is low. The overall vaccination rate against seasonal influenza was 7.3% in 2008. Last year, the overall vaccination rate was only 4.4 % and 16.8 % for people aged 65 or more (17). According to legislation, in Slovenia, the advertisement of the names of vaccines is not allowed, but we can promote protection against infections. Media can have a strong influence on deciding whether or not to be vaccinated. A negative media effect was spread during 2009 influenza pandemic caused by the influenza A (H1N1) 2009 virus (18).

In Slovenia, the role of family physicians in primary care and preventive procedures is very important. The factors influencing patients' decision on taking flu vaccines by their family physicians in Slovenia have not been analyzed yet. This study was designed to find out patients' opinions and attitudes about flu and vaccination, to find out which sources of information are important for patients, and to check if patients feel it is important to take flu vaccinations by their own family physicians. The second goal was to discover possible associations between a decision to take or not to take seasonal flu vaccine with patients' characteristics, and to determine predictors on taking flu vaccinations by their family physicians.

## 2 PATIENTS AND METHODS

### 2.1 Study Design

This was a cross-sectional, multicenter, observational study in Styria region in Slovenia. We included patients who came during our regular family practice visits because of different health problems or the request for flu vaccination. The inclusion criterion was the age of 18 years or more. Patients with acute illnesses were not included in the study. Seven family practice teams from three different primary health centers in Styria region in Slovenia were asked to participate in the study. The patients were asked if they wanted to be vaccinated

against seasonal influenza. Then, the office nurse or family physician asked them to fulfill a questionnaire about their general data and attitudes regarding influenza and vaccination. The patients were asked to fulfill the data about chronic health conditions, about the source of information about flu and vaccination, and about confidence to take the vaccine by their family physician. Each patient was informed about the survey and had an opportunity to ask more questions. Then he/she gave an informed consent to participate. Patients fulfilled questionnaires after the visit or at home and put them into the box. Each family practice team delivered the same number of questionnaires both for patients that accepted the vaccine and for those that refused it. The questionnaires for both groups of patients were labeled according to the acceptance or refusal of vaccination. We planned to deliver 400 questionnaires to patients from October to November 2009. The questionnaires were delivered during consecutive days to the first five eligible patients to take a flu vaccination until all questionnaires were used.

## 2.2 The Questionnaire

The questionnaire had three parts. In the first part, there were questions about the age, gender, marital and employment status, home location (rural, urban), level of education, socioeconomic status and chronic health conditions (pulmonary and heart disease, diabetes mellitus, rheumatologic and kidney disease, immune system disorders and cancer).

The second part of the questionnaire checked their beliefs and knowledge about influenza and vaccination, their perception of possible side effects, safety and efficacy of influenza vaccination, benefits of vaccination for healthy adults, elderly people or those with chronic health conditions, for workers under risk for virus contact, for companies, about their previous influenza vaccination and possible side effects, and about their trust in pharmaceutical companies producing vaccines.

In last part of the questionnaire, patients reported if anybody recommended influenza vaccination to them, and chose their most important source of information about influenza and vaccination. Patients who accepted vaccination also answered the question as to why they had decided to take the vaccine by their family physicians. Those who had refused vaccination specified reasons for refusal.

## 2.3 Statistics

Continuous data was presented as mean and standard deviation (SD), and compared using the t-test. Categorical data was presented as percentages and frequencies, and differences between proportions were compared using the chi-square test. We calculated Cronbach's alpha coefficient for the second part of the questionnaire as a measure of internal consistency.

We assessed the differences between two groups (vaccinated, not vaccinated) in terms of demographic and socioeconomic data, chronic health conditions and beliefs. For all tests,  $p < 0.5$  (2-sided) was considered significant. Logistic regression was performed to find out the most important predictors for the acceptance of influenza vaccination. All analyses were performed using a commercially available software program (SPSS-15.0 statistical software; SPSS Inc, Chicago).

## 3 RESULTS

All family practice teams delivered 400 questionnaires, 200 for each group. The delivery and collection of questionnaires was done in October and November 2009. Out of 400 delivered questionnaires, 300 patients returned them; the response rate was 75 %. One questionnaire was not filled in correctly. Therefore, we analyzed 299 questionnaires, 151 from vaccinated patients and 148 from not-vaccinated patients. Table 1 presents age, gender, economic, marital and other socio-demographic characteristics and differences between vaccinated and not-vaccinated patients regarding these characteristics.

**Table 1.** The differences between vaccinated and not-vaccinated patients regarding age, gender, economic, marital and other socio-demographic characteristics.

Diagnosis	Vaccinated N=151 (%)	Not-vaccinated N=148 (%)	All N=299	p
Gender				0.331
Male	55 (47 %)	62 (53 %)	117	
Female	95 (52.8 %)	85 (47.2 %)	180	
Marital status				0.068
Married	104(53.6 %)	90 (46.4 %)	194	
Single	41(42.3 %)	56 (57.7 %)	97	
Employment status				0.011
Employed	63 (41 %)	91 (59 %)	154	
Jobless	7 (43.7 %)	9 (56.3 %)	16	
Self-employed	6 (66.7 %)	3 (33.3 %)	9	
Retired	67 (62.6 %)	40 (37.4 %)	107	
Pupil, student	4 (50 %)	4 (50 %)	8	
Residence location				0.002
Rural	95 (45 %)	116 (55 %)	21	
Urban	54 (65.1 %)	29 (34.9 %)	83	
Educational status				0.288
Primary school	30 (61.2 %)	19 (38.8 %)	49	
Secondary school	83 (51.2 %)	79 (48.8 %)	162	
Pre-tertiary education	12 (40 %)	18 (60 %)	30	
Tertiary education	23 (43.4 %)	30 (56.6 %)	53	
Socioeconomic status				0.616
Very bad	2 (33.3 %)	4 (66.7 %)	6	
Poor	10 (66.7 %)	5 (33.3 %)	15	
Medium	76 (48.1 %)	82 (51.9 %)	158	
Good	51 (51 %)	49 (49 %)	100	
Excellent	9 (52.9 %)	8 (47.1 %)	17	
Age (years: mean + SD)	54.1 ± 18.1	46.9 ± 16.7	50.5 ± 17.8	<0.001

SD = standard deviation

It is evident that elderly, self employed and retired people decided to uptake flu vaccine more often (Table 1). Also, patients living in urban areas were more inclined to vaccination. The differences in demographic data,

educational status and socioeconomic status regarding the decision to be vaccinated have not reached a statistical importance.

**Table 2.** The differences between vaccinated and not-vaccinated patients regarding chronic health conditions.

Chronic health condition	Vaccinated N=151(%)	Not-vaccinated N=148 (%)	All N=299	p
Pulmonary disease	20 (69 %)	9 (31 %)	29	0.024
Heart disease	43 (71.7 %)	17 (28.3 %)	60	<0.001
Diabetes mellitus	22 (58.6 %)	6 (21.4 %)	28	0.001
Kidney disease	3 (37.5 %)	5 (62.5 %)	8	0.512
Rheumatologic disease	23 (71.9 %)	9 (28.1 %)	32	0.008
Immunodeficiency	7 (63.6 %)	4 (36.3 %)	11	0.307
Cancer	11 (52.4 %)	10 (47.6 %)	21	0.715

We found some chronic health conditions (heart disease, pulmonary disease, rheumatologic disease and diabetes) to be important reasons for patients to be vaccinated (Table 2). Pertaining to patients with kidney disease,

immunodeficiency or cancer, there was not much difference between the vaccinated and non-vaccinated groups.

**Table 3.** Differences between vaccinated and not-vaccinated patients regarding different beliefs, attitudes and previous vaccinations or side effects.

The agreement with beliefs and attitudes	Vaccinated N=151 (%)	Not-vaccinated N=148 (%)	All N=299	p
I have enough information about influenza	89 (53.3 %)	78 (46.7 %)	167	0.020
I have enough information about vaccine safety	84 (62.7 %)	50 (37.3 %)	134	<0.001
I have enough information about vaccine efficiency	83 (66.9 %)	41 (33.1 %)	124	<0.001
I have enough information about possible side-effects	79 (67.5 %)	38 (32.5 %)	117	<0.001
Vaccination is an efficient measure to prevent influenza	96 (75 %)	32 (25 %)	128	<0.001
Vaccination is safe	100 (74.1 %)	35 (25.9 %)	135	<0.001
After vaccination there are usually NO important side-effects	70 (76.1 %)	22 (23.9 %)	92	<0.001
Vaccination can cause many severe diseases	6 (17.6 %)	28 (82.4 %)	34	<0.001
Vaccination harms the immune system	5 (13.9 %)	31 (86.1 %)	36	<0.001
Vaccination is promoted predominantly because of manufacturers' profit	8 (19.5 %)	33 (80.5 %)	41	<0.001
Vaccination is also recommended for a healthy adult person	118 (73.3 %)	43 (26.7 %)	161	<0.001
Vaccination is reasonable for chronically ill and elderly people	123 (62.4 %)	74 (37.6 %)	197	<0.001
Vaccination is reasonable for persons in higher risk because of more contacts with other people	119 (60.1 %)	77 (39.3 %)	196	<0.001
Vaccination is good for companies because it reduces sick-leave absence	99 (78 %)	58 (22 %)	157	<0.001
I have been vaccinated before against influenza	110 (76.4 %)	31 (23.1 %)	141	<0.001
I have already had side effects after vaccination	25 (52.1 %)	23 (47.9 %)	48	0.797

Vaccinated patients had more information about influenza as well as efficacy and safety of vaccination (Table 3). Also, other beliefs and attitudes regarding efficacy, safety, side effects and recommendation for vaccination differed between the groups. Vaccinated and not-vaccinated patients had side effects after previous vaccinations.

We tested the questions regarding beliefs, attitudes and previous vaccinations or side effects for internal consistency. Cronbach's alpha coefficient was 0.66.

**Table 4.** The logistic regression model which predicts vaccination. N=299.

Predictors	Chi-square	Impact factor	95 % Confidence interval	p
Heart disease	11.4	13.52	2.98-61.25	0.001
Belief: Vaccination is an efficient measure to prevent influenza.	11.0	4.27	1.81-10.07	0.001
Belief: After vaccination, there are usually NO important side-effects.	6.0	3.19	1.26-8.09	0.014
Belief: Vaccination does harm to the immune system.	7.0	0.13	0.03-0.60	0.008
Belief: Vaccination is also recommended for a healthy adult person.	7.2	3.43	1.39-8.43	0.007
I have been vaccinated before against influenza.	20.9	6.54	2.92-14.62	<0.001

Dependent variable: 1= vaccinated patients, 0= not-vaccinated patients.

Logistic regression model identified the most important predictors for influenza vaccination uptake (Table 4), namely: heart disease, previous vaccination and an agreement with the belief that vaccination is an efficient measure to prevent influenza. The statistical model reached sensitivity of 87.0% and specificity of 78.4%.

**Table 5.** The differences between groups in terms of the persons who encouraged flu vaccination.

Predictors	Vaccinated n=146 (%)	Not-vaccinated n=129 (%)	All n=275
Family physician	70 (50 %)	70 (50 %)	140
Other physician	7 (50 %)	7 (50 %)	14
Other health care workers	3 (42.9 %)	4 (57.1 %)	7
Family, friends, neighbours	5 (26.3 %)	14 (73.7 %)	19
Patient's own decision	57 (81.4 %)	13 (18.6 %)	70
Company	3 (33.3 %)	6 (66.7 %)	9
Other	1 (6.3 %)	15 (93.7 %)	16

Chi-square:  $p < 0.001$

Patient's own decision was important in decision making (Table 5). Family physician most commonly promoted flu vaccination, but there was no difference between groups. 47.9 % of vaccinated patients and 54.3 % of not-vaccinated patients reported that their family physician encouraged them to take the flu vaccine. A lot of not-vaccinated patients did not take the flu vaccine in spite

of the encouragements from family physicians. Patients' family and friends were less important. Also, other doctors and health care workers did not significantly influence patients' decisions. Multiple answers were possible.

Most patients obtained information about vaccination from their family physicians (45 %), media (29 %) and family, friends or neighbors (29 %). Other health workers were a source of information for 13 % of patients. Most vaccinated patients got the information from their family physicians (56 %), whereas most not-vaccinated patients got it from media (44 %). The difference was statistically significant (Chi-square:  $p < 0.001$ ).

About 75 % of vaccinated patients answered that it is important for them to be vaccinated by their family physician. The main reasons included: the best knowledge of patient's medical problems and trust between a patient and family doctor. Safety and the quality of procedures were not among very important reasons. Only vaccinated patients were asked to answer this question.

Not-vaccinated patients were asked about reasons for the refusal of vaccination. The most common reasons were good health condition (31 %) and fear of side-effects (26 %). Many patients generally did not support vaccination (17 %). Some believed that vaccination is not effective (8 %) and a few that the cost of vaccination is too high. Some patients wrote also other reasons.

#### 4 DISCUSSION

Our study found out that heart disease and certain patients' beliefs are the most important predictors to take flu vaccinations by their family physicians. Family physicians recommended vaccination to 50.9 % of their patients.



Vaccinated patients trusted their family physicians and perceived their recommendations as important sources of information regarding flu and vaccination. The media is the most important source of information for not-vaccinated patients.

In our study, several factors were associated with influenza vaccination. We found that elderly and retired people decided to uptake influenza vaccination more often than younger or employed people. This is a well known fact also from other studies (5, 8, 18, 19). This effect is not specific only to influenza vaccination. Elderly people are also more inclined to pneumococcal vaccination (20, 21). People with chronic health conditions decided to take the vaccine more often. Chronic heart disease was the most important predictor for vaccination. In addition, patients with chronic pulmonary disease, diabetes mellitus and rheumatologic disease were more inclined to vaccination. Almost the same conclusions were drawn in the study including Native American elderly people (22). We can find such an effect also in other studies. Chronic health conditions, the number of medications or previous hospitalizations are usually important predictors for the acceptance vaccination (5, 10, 19, 22-24).

Beliefs and attitudes regarding influenza and flu vaccination were important in the decision-making process. Vaccinated patients more frequently answered that they had enough information about influenza compared to not-vaccinated patients. They believed more in the safety and efficacy of the vaccine and less in the potential side-effects of vaccination. They also believed more in the effectiveness of vaccination in elderly people, people with chronic health condition, and even in healthy adults. Furthermore, other studies found some beliefs to be important in the decision-making process (25). Vaccine effectiveness and safety are often found to be important predictors (26). In healthy elderly people, the fear of side-effects of influenza vaccination and a perceived good health seem to be the main factors leading to noncompliance (27). Patients with chronic health conditions are less influenced by the fear of side effects (10). Not-vaccinated patients also showed a higher level of distrust in modern medicine and pharmaceutical companies. This mistrust in medicine and vaccination was partly associated with the coexisting pandemic caused by the influenza A (H1N1) and numerous media critiques of the recommendations of our health authorities (17). The perceived risk for influenza facilitated the decision of the vaccine uptake (18, 28, 29).

Our final model identified heart diseases, trust in the efficacy of the vaccine and its safety, and the belief that vaccination is effective also for healthy adults, to be important predictors of vaccination. The most powerful predictor for vaccination was vaccination in previous years. Furthermore, in other studies, past behavior is one

of the most powerful predictors of the decision-making process (30).

The recommendation by a family physician was perceived as the major encouraging factor for vaccination, especially for elderly patients (23, 31, 32). In our study, family physicians recommended flu vaccination to 50.9 % of patients. Many patients decided to take vaccine on their own. In this study, family physicians' advice has been shown to be less important, but still more important than patients' families or other factors for vaccination. 74.8% of vaccinated patients answered that it is important to take vaccination by their family physicians, and that the main reason is because their family physicians know all their health conditions. On the other hand, not-vaccinated patients reported two main reasons for such a decision: the perception of their good health and fear of side effects.

#### 4.1 The Limitations of the Study

Our study has two limitations. The first limitation is the coexistence of influenza A (H1N1) pandemic during the collection of the data. The patients' attitudes were changed during influenza pandemic also in other countries (33, 34). The second limitation is that we cannot generalize the data and results to the national level because the sample of patients was limited only to one region in Slovenia. However, a large sample, good response rate and concordance with the results of other studies assure the validity of our results, which should be replicated in further studies.

## 5 CONCLUSIONS

Family physicians in Slovenia often recommend flu vaccination. Patients in general decided for flu vaccination by themselves. Their family physicians proved to be less important in the decision-making process. Vaccinated patients valued family physicians as most important sources of information. On the other hand, media was the most important source of information for not-vaccinated patients. A lot of vaccinated patients said that it was important to be vaccinated by their family physicians and they had confidence in them. Therefore, family physicians should take more time and put in more effort to recommend flu vaccination to their patients and discuss the safety, efficacy and other issues regarding vaccination with them. There are data to promote flu vaccination because of its direct and indirect benefits (35).

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## CONFLICTS OF INTERESTS

The authors had no conflicts of interest to declare in relation to this article.

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