ATTITUDES TOWARDS VACCINATION AGAINST COVID-19 AMONG SECONDARY SCHOOL STAFF
POSTOJE ZAMESTNANCOV STREDNÝCH ŠKÔL K OČKOVANIU PROTI COVID-19

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ABSTRACT

Background: Vaccination against COVID-19 is the most effective preventive measure for maintaining school teaching.
Aim: The aim of this study is to evaluate the attitudes towards vaccination against COVID-19 among secondary school staff.
Material and methods: A cross-sectional study was realize using anonymous questionnaires (October to November 2021). EPI Info 7 was used for multivariate logistic regression analysis. The chi-square test and Fisher's exact test were used for pairwise comparisons. Student's t-test was used to compare the two averages.
Results: The questionnaire was completed by 493 school staffs. The number of employees vaccinated against COVID-19 was 391 (79.3 %). The strongest motivation for vaccination against COVID-19 was the protection of family members (70.8 %) and efforts to prevent the spread of COVID-19 during performance of the profession (65.5 %). The statistically significant predictors were overcoming COVID-19 (OR 0.45; 95 % CI 0.28-0.72) and influenza vaccination (OR 2.27; 95% CI 1.20-4.32). The strongest reason unvaccinated group for hesitancy vaccination against COVID-19 was the fear of vaccine safety (70.6 %) and distrust of vaccine efficacy (41.2 %).
Conclusion: Teachers can influence young people with their attitudes towards vaccination against COVID-19 only if they themselves are convinced of the importance of vaccination. For this reason, it is necessary to know their attitudes towards vaccination against COVID-19.

Key words: School staff. COVID-19. Acceptance. Vaccination

ABSTRAKT

Východiská: Očkovanie proti COVID-19 je najúčinnejším preventívnym opatrením pre zachovanie prezenčného vyučovania.
Cieľ: Cieľom tejto štúdie je zhodnotiť postoje zamestnancov stredných škôl k očkovaniu proti COVID-19.
Materiál a metódy: Prierezová štúdia bola realizovaná pomocou anonymných dotazníkov (október až november 2021). Multivariatná logistická regresia bola spracovaná v EPI Info 7. Na párové porovnanie bol použitý chi-square test a Fisher's exact test. Na porovnanie dvoch priemerov bol použitý Student's t-test.
Výsledky: Dotazník vyplnilo 493 zamestnancov škôl. Počet zamestnancov zaočkovaných proti COVID-19 bol 391 (79,3 %). Najsilnejšou motiváciou pre očkovanie proti COVID-19 bola ochrana rodinných príslušníkov (70,8 %) a snaha zabrániť šíreniu COVID-19 pri výkone povolania (65,5 %). Štatisticky významnými prediktormi bolo prekonanie COVID-19 (OR 0,45; 95 % CI 0,28-0,72) a očkovanie proti chrípke (OR 2,27; 95 % CI 1,20-4,32). Najsilnejším dôvodom, prečo neočkovaná skupina váhala s očkovaním proti COVID-19, bol strach z bezpečnosti vakcíny (70,6 %) a nedôvera v účinnosť vakcíny (41,2 %).
Záver: Učitelia môžu svojimi postojmi k očkovaniu proti COVID-19 ovplyvniť mladých ľudí len vtedy, ak sú sami presvedčení o dôležitosti očkovania. Z tohto dôvodu je potrebné poznať ich postoje k očkovaniu proti COVID-19.

Kľúčové slová: Školskí zamestnanci. COVID-19. Akceptácia. Očkovanie

INTRODUCTION

Since 11 March 2020, the world has been facing a new challenge, the management of coronavirus disease (COVID-19). State policies seek to minimize the impact of this respiratory disease through guidelines, recommendations as well as the promotion of vaccination. The rapidly spreading coronavirus SARS-CoV-2 has been associated with the temporary closure of schools and a change to an online form of education [1]. This way of education has been found to have a negative impact on social interactions and children's education. For this reason, national governments are currently working to prevent the complete closure of schools [2]. In the schools is necessary to implement hygienic measures to reduce the spread of the disease, such as handwashing, wearing face masks, regular room ventilation, but also vaccination of teachers or students. To maintain teaching, teachers were assigned to the one of the priority vaccination groups. School staff is a group that is more at risk of infection due to regular contact with the younger generations. At present, we know that children are more likely to have a mild/asymptomatic COVID-19, which can lead to later diagnosis and faster spread of coronavirus SARS-CoV-2 [3, 4]. On the other hand, several studies at the beginning of the pandemic concluded that the incidence of COVID-19 was lower in children due to school closures and suspension of leisure activities, but also due to a lower probability of testing [5]. Among other things, several studies

suggest that teaching staff may play an important role in the transmission of COVID-19, especially if social distancing and the proper wearing of a face mask are not observed. Teaching staff seem to play an important role in the SARS-CoV-2 transmission chain in relation to other educators, students, and households, underlining the importance of educator prevention [6]. In Slovakia, teaching staff were included in the first phase of vaccination, which began on February 13, 2021. It is clear from the statistics that even though the Slovak Republic has enough vaccines, the population's interest in vaccination is low compared to other countries, for example, persons fully vaccinated (May 5, 2022): Czech Republic – 64.0 %, Hungary – 64.3 %, Poland – 59.4 % and Slovakia – 50.8 % [7].

The aim of this study is to evaluate the attitudes towards vaccination against COVID-19 among school staff.

MATERIAL AND METHODS

Study population

The cross-sectional study was realized using anonymous questionnaires in the period from October 9 to November 9, 2021. Questionnaires were sent to work email addresses of employees of secondary schools (N = 3401) in the one region of Slovakia. The return rate of the questionnaires was 493, which represents 14.5 %. Employees were instructed not to complete the questionnaire more than once (avoidance of duplicate answers). School staff who have been vaccinated with at last one dose of COVID-19 vaccine have been assigned to the vaccinated group. Employees who were not vaccinated with any of the COVID-19 vaccines were included in the non-vaccinated group.

Questionnaire

We used a modified questionnaire from Štěpánek et al. (2021) [8]. In the original questionnaire, we only changed the area of the profession. We used the Microsoft Forms (Office 365 online survey creator) for creation and distribution. The questionnaire consisted mostly of closed questions. For both groups (vaccinated and non-vaccinated), the same questions focused on gender, number of years in the profession, job classification, presence of chronic disease, overcoming COVID-19, influenza vaccination, assessment of general fear of COVID-19, attitudes on mandatory vaccination against COVID-19 in different groups of the population (teachers, medical staff, selected groups, and the general population) [9]. In the group of vaccines, we used questions to find out the reason for the motivation to vaccinate and used Covid-19 vaccine – Comirnaty (Pfizer a BioNTech), Spikevax (Moderna), Vaxzevria (AstraZeneca), Janssen (Johnson&Johnson), Sputnik V (Gamalej Institute). In the non-vaccinated group, we determined the reason for non-vaccination. Employees were included in the group teaching staff and non-teaching staff according to Act No. 138/2019 on pedagogical employees and professional employees and on the change and supplement to some acts [10]. The professions of teacher, special educators, teaching assistants, Master of Vocational Education and educators were included in the group of teaching staff. Psychologists and other non-pedagogical staff were included in the group of non-teaching staff.

Data analysis

Descriptive statistics methods in the EPI Info 7 program were used for statistical analyses. The chi-square test and Fisher's exact test were used for pairwise comparisons. Student's t-test was used to compare the two averages. A multivariate logistic analysis was performed to estimate the development of vaccination against COVID-19. Odds ratios with 95 % confidence intervals were used to identify statistically significant differences between the vaccinated and unvaccinated groups. The p value <0.05 was considered statistically significant.

RESULTS

As part of the questionnaire, we also sought information on the socio-demographic charac-teristics of the respondents. The questionnaire was completed by 493 school staff, 137 men (27.8 %) and 356 women (72.2 %). The number of school staff vaccinated against COVID-19 was 391 (79.3 %). The majority of the vaccinated group (214; 54.7 %) were vaccinated with Vaxzevria (AstraZeneca). The Comirnaty vaccine (Pfizer-BioNTech) received 112 (28.6 %) of respondents. The Spikevax (Moderna) was used in 61 (15.6 %). The Janssen (Johnson&Johnson) was used in 3 (0.8 %) and the Sputnik V (Gamalej Institute) was applied to only one employee (0.3 %). Less than 24 % of all respondents (N = 118) reported to have had a previous infection from SARS-CoV-2. In the questionnaire, we found out the number of years in practice, the presence of

chronic diseases (118 respondents) and flu vaccinations (last season and in the past). A statistically significant relationship was demonstrated between vaccinated and non-vaccinated in influenza vaccination (last season and in the past). The influenza vaccine group was also vaccinated against COVID-19. The results also show that school staff who have overcome COVID-19 have been vaccinated against COVID-19.

A comparison of vaccinated and non-vaccinated showed that vaccinated group have a higher level of fear of COVID-19 (Tab. 1).

The strongest motivation of the vaccinated people (N = 391) for vaccination against COVID-19 was the protection of family members (70.8 %) and efforts to prevent the spread of COVID-19 during performance of the profession (65.5 %). Only 20.7 % of vaccinated respondents answered, „Being exempted from restrictive anti-pandemic measures after vaccination". A comparison of vaccinated school staff who overcame COVID-19 compared to staff who did not overcome COVID-19 in the question: „Concerns about COVID-19 itself" was statistically significant. A comparison of vaccinated teaching staff and vaccinated non-teaching staff in question „Other" was also statistically significant (Tab. 2).

Unvaccinated respondents (N = 102) had a lower fear of COVID-19 compared to vaccinated school staff (N = 391). The strongest reason for hesitancy vaccination against COVID-19 was the fear of vaccine safety (70.6 %) and distrust of vaccine efficacy (41.2 %). A comparison of unvaccinated school staff who overcame COVID-19 compared to unvaccinated staff who did not overcome COVID-19 was statistically significant (Tab. 3).

Table 1 Socio-demographic characteristics of all respondents

Characteristics	Total (N = 493)	Vaccinated (N = 391)	Unvaccinated (N = 102)	p-value
Male N (%)	137	113 (28.9)	24 (23.5)	0.2809
Female N (%)	356	278 (71.1)	78 (76.5)	0.2809
Teaching staff N (%)	451	356 (91.1)	95 (93.1)	0.5010
Non-teaching staff N (%)	42	35 (9.0)	7 (6.9)	0.5010
Job duration (years; average ± SD)	20.5 ±11.8	20.3 ± 11.7	18.5 ± 11.9	0.2360
Level of fear of Covid-19 (years; average ± SD)	5.9 ± 2.8	6.8 ± 2.7	4.0 ± 2.7	< 0.0001*
History of Covid-19 N (%)	118	81 (20.7)	37 (36.3)	0.0010**
Influenza vaccinated at any time in the past N (%)	114	101 (25.8)	13 (12.8)	0.0053**
Influenza vaccinated last season N (%)	36	36 (9.2)	0	0.0006**
With a chronic disease N (%)	118	97 (24.8)	21 (20.6)	0.4349

Legend: * p <0.05 (Student's t-test); ** p <0.05 (chi-square test)

Table 2 Motives of the vaccinated people to get vaccinated against COVID-19 (N = 391)

Motives N (%)	Teaching staff (N = 356) / Non-teaching staff (N = 35)	History of COVID-19 (N = 81) / No history of COVID-19 (N = 310)
Concerns about COVID-19 itself	214 (60.1)	40 (49.4) *
	19 (54.3)	193 (62.3) *
An effort to prevent the spread of COVID-19 during the performance of my profession	235 (66.0)	49 (60.5)
	21 (60.0)	207 (66.8)
An effort to protect family members	257 (72.2)	56 (69.1)
	20 (57.1)	220 (71.0)
Being exempted from restrictive anti-pandemic measures after vaccination	75 (21.1)	16 (19.8)
	6 (17.1)	65 (21.0)
Others	23 (6.5) *	5 (6.2)
	6 (17.1) *	26 (8.4)

Legend: * p <0.05 (*Chi-Square* test); multiple-choice options

As part of the research, we sought an opinion on mandatory vaccination for individual groups of the population (teachers, medical staff, selected groups of the population and the whole population). Less than 54 % of vaccinated respondents think that vaccination of medical staff should be mandatory. About 47 % of vaccinated respondents think that vaccination should be mandatory in the selected population and 46 % of vaccinated respondents think that vaccination should be mandatory for teachers. In the area of mandatory vaccination of teachers, medical staff, selected population, and whole population was a statistically significant comparison of opinions between vaccinated and non-vaccinated respondents. However, a comparison by occupation (teaching staff versus non-teaching staff) was not statistically significant (Tab. 4). Multivariate logistic regression analysis was used to compare vaccinated and non-vaccinated. The predictors were gender, job duration (years), job classification (teaching staff vs. non-teaching staff), overcoming COVID-19 disease, the presence of a chronic disease and influenza vaccinated.

A statistically significant relationship was demonstrated in the case of COVID-19 disease and influenza vaccination. Opinions on the introduction of mandatory vaccination were not included in the model because all vaccinated respondents were in favour of introducing compulsory vaccination (Tab. 5).

As other studies show, educators may play an important role in the transmission of COVID-19 in schools. In a study Ismail et al. (2020) COVID-19 was found to be the most common from teacher to teacher [11]. Teachers play a key role in the chains of infection to other educators, students, and households, which underline the prevention of COVID-19 infection in teachers [6].

Table 3 Reasons of the unvaccinated people for personal COVID-19 vaccine hesitancy (N = 102)

Motives N (%)	**Teaching staff (N = 95)**	**History of COVID-19 (N = 37)**
	Non-teaching staff (N = 7)	**No history of COVID-19 (N = 65)**
I am not afraid of COVID-19, its course and consequences	10 (10.5)	5 (13.5)
	1 (14.3)	5 (7.7)
I do not find getting infected with COVID-19 likely	4 (4.2)	0
	0	4 (6.2)
I do not trust the efficacy of vaccines against COVID-19	39 (41.1)	9 (24.3)
	3 (42.9)	27 (41.5)
I have concerns about the safety and side effects of vaccines against COVID-19	68 (71.6)	27 (73.0)
	4 (57.1)	44 (67.7)
I went through COVID-19 and assume lasting immunity against disease	16 (16.8)	17 (45.9) *
	1 (14.3)	0 *
I have contraindications of expect a complicated vaccination course in my case	25 (26.3)	7 (18.9)
	2 (28.6)	21 (32.3)
Others N	14 (14.7)	5 (13.5)
	1 (14.3)	8 (12.3)

Legend: * p <0.05 (Chi-Square Test; Fisher exact test); multiple-choice options

Table 4 Opinion on the introduction of mandatory vaccination against COVID-19

Mandatory vaccination (%)	**COVID-19 Vaccination**			**Occupation**		
	Vaccinated (N = 391)	**Unvaccinated (N = 102)**	***p* Value**	**Teaching staff (N = 451)**	**Non-teaching staff (N = 42)**	***p* Value**
Teachers	180 (46.0)	0	< 0.05 *	163 (36.1)	17 (40.5)	0.58
Medical staff	211 (54.0)	0	< 0.05 *	190 (42.1)	21 (50.0)	0.32
Selected population	185 (47.3)	3 (2.9)	< 0.05 *	169 (37.5)	16 (38.1)	0.94
Whole population	124 (31.7)	0	< 0.05 *	110 (24.4)	14 (33.3)	0.20

Legend: * p <0.05 (Chi-Square Test; Fisher exact test)

Table 5 Predictors of COVID-19 vaccination (multivariate logistic regression analysis)

Variable	Odds ratio	95% CI (confidence interval)	p- value
Gender (females)	0.80	0.47 – 1.34	0.39
Job duration (years)	1.01	0.99 – 1.03	0.21
Teaching staff vs. Non-teaching staff	0.60	0.25 – 1.43	0.25
History of COVID-19	0.45	0.28 – 0.72	< 0.05 *
With a chronic disease	1.12	0.64 – 1.96	0.69
Influenza vaccinated	2.27	1.20 – 4.32	< 0.05 *

Legend: * p <0.05

In a study Gaffney et al. (2020), which assessed the prevalence of risk factors for severe COVID-19 disease among school staff, 39.8 % of teachers and 41.4 % of non-teaching staff had clear risk factors [12]. In our study, 118 respondents had chronic illness (teachers 22.6 % and non-pedagogical 38.1%). However, in our sample of respondents we found out only the presence of diagnosed chronic diseases, while the risk factor may also be obesity, smoking, unhealthy lifestyle, etc. Although chronic diseases are a risk factor in the context of the worse course of the disease COVID-19, our study did not show statistical significance among school staff with the presence of chronic disease and higher vaccination against COVID-19.

In our study, influenza vaccination was statistically significantly related to COVID-19 vaccination. These data correlate with other studies where seasonal influenza vaccination has been positively associated with COVID-19 vaccine acceptance [13].

The study Choe et al. (2022) pointed out the differences in the spread of COVID-19 in the types of schools [14]. The incidence rate among students and school staff was highest in secondary schools. As for the measures, it is essential that teachers minimize personal interactions with each other, adhere to the correct use of masks and, of course, be vaccinated against COVID-19. Vaccination is the best protection measure. Currently, only a few studies have evaluated the fear of COVID-19 in school staff, as well as the attitudes of school staff to accept vaccination. A cross-sectional study realized in Germany (2020) concluded that up to half of school staff had a medium to very high fear of infection and 59% of respondents reported a medium to high risk of infection [15]. The results of this study are consistent with our results, with approximately half of respondents reporting moderate to high levels of fear of COVID-19 (5.9 ± 2.8). In our results, there was a statistically significant level of fear of COVID-19 in the vaccinated compared to the non-vaccinated. The vaccinated had a higher level of fear (6.8 ± 2.7) compared to the unvaccinated (4.0 ± 2.7). In a study Weinert et al. (2021) up to 73% of teachers were found to be afraid of SARS-CoV-2 [16]. Our results correlate with this study, with 79.3% of respondents vaccinated in our research, with the greatest motives for vaccination being to protect family members (70.8%), prevent the spread of the disease during their profession (65.5%) and concerns about COVID-19 itself (59.6%).

Fears of side effects, safety and efficacy are the most common reasons for the rejection of the vaccine against COVID-19 [17]. These results correlate with our findings, where the strongest reason for hesitancy vaccination against COVID-19 was the fear of vaccine safety (70.6%) and distrust of vaccine efficacy (41.2%). With many different variants of COVID-19 [18] and many different types of vaccines against it [19] people may experience fear due to the novelty and uncertainties associated with the disease and vaccines [20].

Due to low vaccination coverage, the introduction of mandatory vaccination for selected population groups (health professionals, teachers, etc.) was considered in Slovakia. Some countries have introduced mandatory vaccination among healthcare professionals or among general population [21-24]. Mandatory vaccination was evaluated more positively by vaccinated school staff compared to non-vaccinated. Only three unvaccinated respondents responded positively to mandatory vaccination in selected population groups. All unvaccinated respondents in our study did not agree with the mandatory vaccination of teachers, health professionals and the general population. There was no statistically significant difference between men and women in the issue of compulsory vaccination.

A statistical difference in this area was noted between the unvaccinated versus the vaccinated. In addition to the above-mentioned factors, the number of years in the profession and job classification (teaching staff and non-teaching staff) proved to be statistically insignificant.

Limitations and Strengths

The main strength is this first study to evaluate the COVID-19 vaccine hesitancy among school employees in Slovakia. Within the available sources, this is one of the few studies in the world. The first limitation of this study is due to the non-standardised questionnaire and the relatively low return rate of the questionnaire.

CONCLUSION

Secondary school staff are among the risk groups in relation to COVID-19. Protection against COVID-19 in this population may be like influenza through vaccination. The strongest motivation for vaccination against COVID-19 was the protection of family members and efforts to prevent the spread of COVID-19 during performance of the profession. The strongest reason for hesitancy vaccination against COVID-19 was the fear of vaccine safety and distrust of vaccine efficacy.

Despite the global release of measures, it is important to know the attitudes of selected population groups towards vaccination. Teachers are a group of the population that can influence a large part of the general population, especially young people, with their views and attitudes.

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Ethical approval

The study protocol was approved by the Ethics Committee at the Comenius University in Bratislava, Jessenius Faculty of Medicine in Martin (reference no. EK 138/2018).

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