

COVID-19 vaccine hesitancy among lymphoma patients in Poland

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Abstract

Introduction: The coronavirus disease 2019 (COVID-19) pandemic has affected the health of the entire population. Neoplastic diseases of the immune system are associated with increased COVID-related mortality. Vaccination is the only effective way to reduce morbidity and mortality, yet vaccine hesitancy has been observed. The aim of this study was to assess attitudes towards vaccination among lymphoma patients and to identify vaccine hesitancy predictors.

Material and methods: The study was conducted on 280 patients with lymphoma who took part anonymously in a web-based survey prepared by the Pokonaj Chłoniaka Foundation. The survey assessed: attitude to and perception of COVID-19 vaccines, the perceived likelihood of COVID-19 infection, personal experiences with COVID-19, and demographic data.

Results: In our sample, almost one patient in three was vaccine-hesitant. The percentage was higher among patients living in the countryside, villages and smaller towns and in those not educated beyond high school level. The acceptance of vaccination increased with patient age. The high number of skeptical patients could be potentially dangerous, with regard to the high COVID-related complications and mortality.

Conclusions: Clear and easily understood information on COVID vaccines can reduce the risk of COVID-related issues. This subject should be addressed in educational campaigns focused particularly on the identified groups of vaccination skeptics.

Key words: COVID-19, vaccine hesitancy, lymphoma

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Introduction

Since the end of 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread all around the world leading to the coronavirus disease 2019 (COVID-19) pandemic. Vaccinations are regarded as the single most efficient way of controlling the disease spread, related morbidity and inevitable life loss. The percentage of people who need to be immune in order to achieve 'herd immunity' varies with each disease. Measles requires about 95% of

a population to be vaccinated; for polio, the threshold is about 80%, and for COVID-19 we can only estimate. Several types of vaccines are available in Poland. Over 300,000 people can be vaccinated daily [1]. However, despite vaccine availability, the national vaccination program could be jeopardized by increasing vaccine hesitancy [2–4].

Age and comorbidities are the main risk factors for a severe course of COVID-19 [5–7]. Neoplastic diseases, and particularly neoplastic diseases of the immune system, are associated with increased COVID-related mortality [8]. This

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Table I. Relationships between attitudes towards vaccination and sociodemographic data*

Sociodemographic data	Vaccine supporters		Vaccine skeptics		χ^2	p	ϕ
	N	[%]	N	[%]			
Sex (n =274)							
Women	42	23.6	31	32.3	2.41	0.120	-0.09
Men	136	76.4	65	67.7			
Place of residence (n =269)							
Village	35	20.1	27	28.4	10.46	0.015	0.20
Town (up to 50,000 inhabitants)	35	20.1	24	25.4			
City (50,000–250,000 inhabitants)	38	21.8	26	27.4			
Large city (>250,000 inhabitants)	66	37.9	18	18.9			
Education (n =269)							
Primary	1	0.6	2	2.1	11.13**	<0,001	0,20
High school	64	36.8	53	55.8			
University	109	62.6	40	42.1			
Marital status (n =268)							
Single	48	27.6	23	24.5	0.31	0.581	-0.03
In relationship	126	72.4	71	75.5			

*Different sample sizes are due to missing data; **Fisher's Exact Test; χ^2 – chi-square; p – significance level; ϕ – phi, strength of effect

was confirmed by the COVID-19 and Cancer Consortium (CCC19) study on 1,018 patients [9]. In a nationwide study in China, 39% of cancer patients with COVID-19 developed severe symptoms, compared to only 8% of non-cancer COVID-19 patients [10]. In a multi-center retrospective study in cancer patients, severe COVID symptoms were observed in 66.67% and 34.29% with hematological malignancies and metastatic solid tumors, respectively [11].

The aim of this study was to present lymphoma patients' attitudes towards vaccination and to identify vaccine hesitancy predictors and vaccine uptake predictors. The application purpose is to identify the factors that could be crucial in creating educational campaigns for patients in order to maximize the vaccination uptake rate.

Material and methods

This study was conducted on 280 lymphoma patients willing to take part anonymously in a web-based survey prepared by the Pokonaj Chłoniaka Foundation. We developed the survey based on psychosociological experience and literature [12–14]. The survey assessed: attitude to and perception of COVID-19 vaccines, the perceived likelihood of COVID-19 infection, personal experiences with COVID-19, and demographic data. Confidentiality of information was assured. Participants were permitted to terminate participation at any time. For data valuation, descriptive statistics methods and nonparametric tests was used to identify predictors of COVID-19 vaccine hesitancy and uptake. Statistical analysis was performed using SPSS software.

Results

The survey was completed by 280 patients. The study group was characteristic of internet-based surveys. In Table I, we set out demographic and sociological aspects. Males completed our questionnaire more frequently (73% males, 27% females), there were more responders with a university degree (55.3%) compared to high school graduates (43.4%) and to those completing only primary education (1.1%). Younger patients tended to respond more frequently than elderly. Hodgkin's Lymphoma is over-represented in our data (27% of responders, while this subtype accounts for a maximum of 10% of lymphoma cases). It also reflects much greater internet-based activity in younger people (Figure 1). The responders were representative with respect to their place of residence and marital status. Our survey covered lymphoma patients at diagnosis, during the first line therapy, with relapsing/refractory disease, and after completion of treatment (Figure 2).

Nearly 35% of respondents were skeptical about COVID-19 vaccination (see Figure 3, Table II). The skeptics underestimated the risk of COVID-related complications: only 31% estimated the risk at more than 20%, compared to almost 50% among vaccine supporters.

Our analysis demonstrated that the attitude towards vaccination depended on place of residence and education level. There was greater support for vaccination among patients living in large cities, defined as having more than 250,000 inhabitants (38 vs. 19%, $p < 0.001$)

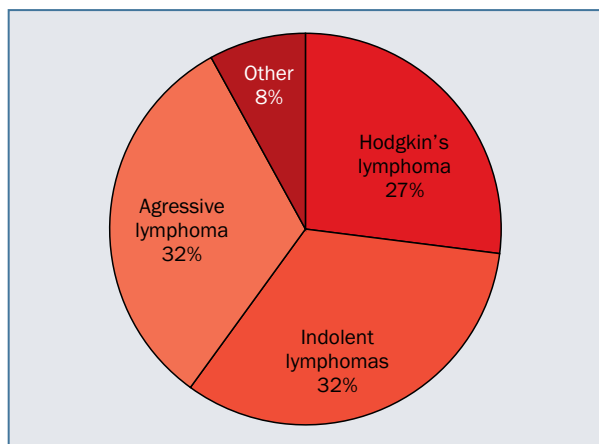


Figure 1. Distribution of respondents according to diagnosis

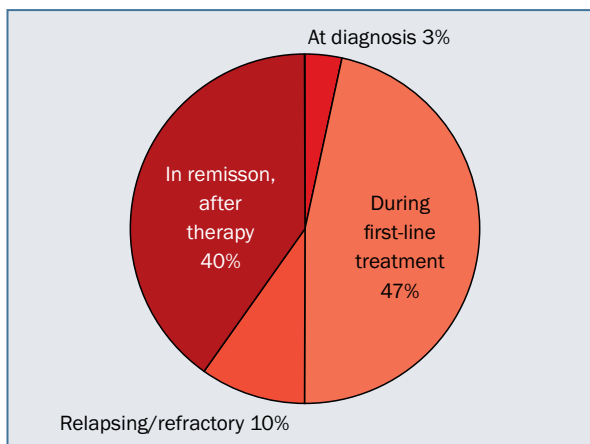


Figure 2. Distribution of respondents according to stage of treatment

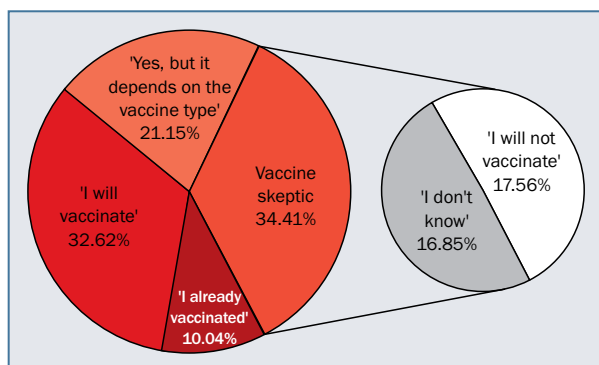


Figure 3. Response to question: "Will you take anti-COVID vaccine?"

and those with a university education (63 vs. 42%, $p < 0.001$). We also found an age difference between vaccine skeptics and vaccine supporters. People whose attitude towards vaccination was positive were older (Me = 44.0 vs. Me = 38.5, Mann-Whitney U test $U = 5,630.00$, $Z = -2.41$, $p = 0.016$, $\eta^2 = 0.02$). Other sociodemographic variables were not significantly predictive (Table I). Disease-related variables (diagnosis, treatment stage) did not turn out to be predictive of vaccine hesitancy (Table III).

Discussion

Nearly a third of participants were hesitant about being vaccinated. In other studies conducted among oncology patients, a more enthusiastic approach has been noted [15]. In the study by Brodziak et al. [16], a negative attitude towards vaccination was presented by 8.5% of participants, neutral by 17.8%, and positive by 73.7% [16]. Published studies underscore that the most significant factor influencing attitudes towards vaccination seems to be fear of adverse events after vaccination [17, 18].

Table II. Relationships between attitudes towards vaccination and risk of complications after coronavirus disease 2019 (COVID-19) infection, as estimated by patients (n = 270)

Risk of complications after COVID-19 infection, as estimated by patients	Vaccine supporters		Vaccine skeptics		χ^2	p	ϕ
	N	[%]	N	[%]			
Less than 5%	10	5.7	8	8.5	7.53	0.110	0.17
5-10%	8	4.5	7	7.4			
10-20%	13	7.4	5	5.3			
More than 20%	81	46.0	29	30.9			
Don't know	64	36.4	45	47.9			

χ^2 – chi-square; p – significance level; ϕ – phi, strength of effect

Reluctance to vaccinate against COVID-19 among patients with a diminished immune response could cause a potentially worrying increase in COVID-related morbidity and mortality. In our sample, almost one third of patients were vaccine-hesitant. This percentage of skeptical patients is worrying. Vaccination is the only effective way to reduce morbidity and mortality [19], and there is an urgent need to support patients with reliable information and knowledge.

In this study, attitudes toward vaccinating significantly depended on the place of residence, education level, and age. Smaller places of residence, as well as younger age and lower education levels, demonstrated greater reluctance to vaccinate. Brodziak et al. [16] have shown similar

Table III. Relationships between attitudes towards vaccination and lymphoma subtype and therapy

Disease and treatment data	Vaccine supporters		Vaccine skeptics		χ^2	<i>p</i>	ϕ
	N	[%]	N	[%]			
Diagnosis (n =269)							
Hodgkin's lymphoma	49	28.0	24	25.5	2.20	0.533	0.09
Indolent lymphoma	62	35.4	28	29.8			
Aggressive lymphoma	50	28.6	35	37.2			
Other	14	8.0	7	7.4			
Phase of disease (n =274)							
At diagnosis	4	2.2	4	4.2	2.94	0.401	0.10
During first-line treatment	82	46.1	48	50.0			
Relapsing/refractory	21	11.8	6	6.3			
In remission, after therapy	71	39.9	38	39.6			
During anti-lymphoma therapy (n =274)							
Yes	142	79.8	69	71.9	2.20	0.138	-0.09
Nie	36	20.2	27	28.1			

findings in a group of oncology patients, highlighting the crucial influence of education about the effectiveness and adverse effects of vaccine. The clear correlation between poorer education and an unwilling attitude shows a burning need to elevate patient knowledge about vaccination. Kelkar et al. [17] confirmed that patients after an educational webinar were more willing to vaccinate against COVID-19 [17].

Published studies show that trust in, and authority of, the attending physician has a positive effect and a direct impact on willingness to vaccinate [17]. A solid physician knowledge of vaccine safety and efficacy is therefore essential [20]. This correlation was not firmly confirmed in our study, but we observed a trend towards confirming this relation (see Table III).

The high number of skeptical patients is potentially dangerous, considering high COVID-related complications and mortality. Easily understood information on COVID vaccines could reduce the risk of COVID-related issues. This topic should be addressed in educational campaigns focused particularly on the identified groups of vaccination skeptics.

Conclusions

The majority of this cohort had positive attitudes towards vaccination, but the number of skeptical patients is worrying. These results demonstrate the need to enhance patient knowledge about COVID-19 vaccine, as the group of patients with lymphomas is particularly vulnerable to complications as a result of COVID infection. Patients should also be provided with clear information regarding the risk of complications related to COVID infection.

Authors' contributions

BB, PZ – manuscript writing. All authors – design of study, collection of data, critical revision and approval.

Conflict of interest

None.

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None.

Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; EU Directive 2010/63/EU for animal experiments; Uniform requirements for manuscripts submitted to biomedical journals.

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