A Prospective Questionnaire-Based Study to Evaluate Factors Affecting the Decision to Receive COVID-19 Vaccination in 267 Patients with Inflammatory Bowel Disease in Poland

Michał Łodyga 1, 2
Katarzyna Maciejewska 2
Grażyna Rydzewska 1, 3

Background:
The aim of the study was to assess the rate of COVID-19 vaccination and the attitudes toward receiving COVID-19 vaccination among patients with inflammatory bowel disease (IBD) in Poland. An important aim of the study was to determine why some people get vaccinated and others refuse to do so.

Material/Methods:
This was a single-center, prospective survey. The study included 267 IBD patients who agreed to complete an anonymous questionnaire comprising 31 questions.

Results:
We found that 71.2% of the IBD patients had been vaccinated. The history of COVID-19 was associated with a lower vaccination rate (16.9% vs 36.8%; \( P = 0.001 \)), regardless of IBD severity. In the vaccinated group, there were more vaccinated people among household members (90.4% vs 43.4%; \( P < 0.001 \)) and friends (52.9% vs 22.4%; \( P < 0.001 \)). Family safety (71.1%), the desire to avoid COVID-19 (67.9%), social responsibility (60.5%), the desire to return to normal life (51.6%), and faith in vaccination as such (43.2%) were the most common reasons for vaccination. The most common cause of non-vaccination was concern about adverse effects (50.0%), including long-term adverse effects (36.8%), and about the possible exacerbation of gastroenterological disease (34.2%).

Conclusions:
IBD patients are more likely to be vaccinated against SARS-CoV-2 than the rest of the population in Poland. Young age, low socioeconomic status, low education, and living in the countryside were factors associated with lower vaccination rates. Family and friends had the greatest influence on the decision to vaccinate, but the influence of the mass media was very small.

Keywords: COVID-19 • Inflammatory Bowel Diseases • Vaccination

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**Background**

The invention of the SARS-CoV-2 virus vaccine is a milestone in the fight against the COVID-19 pandemic. It is worth noting that the most effective vaccines are based on mRNA technology, which is being used for the first time. This makes the invention of the vaccine even more impressive. Another, no less important, challenge was to vaccinate as many people as possible. This seems to be the only way to stop the spread of the virus and end the pandemic. This task turned out to be difficult not just for logistical reasons, but also, more importantly, in convincing the vast majority of the population to get vaccinated [1].

Significant geographic variations in vaccination rates were apparent from the outset. Initially, these were mainly due to the availability of vaccines, and, over time, the main difference was the percentage of people skeptical about vaccination in a given society. Skepticism usually builds up over time. There were several reasons for this. With time, data on the effectiveness of vaccinations began to appear, which clearly indicated that they are not able to completely eliminate the transmission of the virus, and their role is primarily to reduce the risk of a severe course of the disease and death [2]. It was found that vaccinations have to be repeated [3]. In addition, subsequent mutations of the virus that began to dominate were admittedly more infectious, but the disease caused a severe course and death for a smaller percentage [4]. With the increasing numbers of people vaccinated, concerns about the safety of the vaccines themselves arose periodically, which, although dispelled by the world of science, often still existed in the virtual world [5]. Taken together, these facts reduced the feeling of the need to be vaccinated in many people.

According to current population data from the Polish Ministry of Health, 60% of the general population have been fully vaccinated for COVID-19 [6], which is less than in some other countries in Europe (for example, 81% in France and 96% in Portugal (data as of 2 July 2022) [7]).

This fact could be expected in the context of the results of studies assessing the willingness to be vaccinated at the beginning of the vaccination campaign in the Polish general population, in which a high level of skepticism regarding vaccinations was observed (eg, in the study by Sowa et al [8] only 50.8% of the population stated they had been vaccinated).

Vaccinations, although recommended for everyone, are particularly important for people at risk of both infection and severe course of the disease. These groups include, among others, people with chronic diseases and those who are immunosuppressed (eg, as a result of the use of immunosuppressive drugs). Therefore, this group includes patients with inflammatory bowel disease (IBD) [9,10].

For this reason, the progress of vaccination in this group of patients has been studied. The available data are inconclusive. For example, a study in France found a similar proportion to the general population planning to be vaccinated in that country [11]. Similar conclusions can be drawn from studies carried out in Italy [12] and the USA [13], where a very high percentage of IBD patients stated they had been vaccinated (80.3% and 80.9%, respectively). In contrast, in 2 studies from China, the percentage of IBD patients who declared their willingness to be vaccinated and who had already been vaccinated was small [14,15]. Similar data come from Germany [16].

Therefore, this prospective questionnaire-based study aimed to evaluate factors affecting the decision to receive COVID-19 vaccination in 267 patients with inflammatory bowel disease in Poland.

**Material and Methods**

**Ethics Approval**

This study was approved by the Ethics and Supervision Committee for Human and Animal Research at the Central Clinical Hospital of the Ministry of the Interior and Administration in Warsaw, Poland (no. 108/2021). All patients provided written informed consent to participate in the study.

**Anonymity**

The consent to the study and the questionnaire were separate from each other. They were also processed and entered into the database separately to maintain the anonymity of the data provided by the patient in the questionnaire. The questionnaire did not contain data by which it would be possible to identify the person completing the survey.

**Study Population**

This was a single-center, prospective survey. The study included 267 IBD adult patients – 160 with Crohn’s disease (CD) and 107 with ulcerative colitis (UC) – regardless of the activity, form of the disease, and medications taken, who were visiting the center for various reasons (eg, administration of a biological drug, diagnostic tests, a visit to the outpatient clinic) between 1 September and 30 November 2021, and agreed to complete an anonymous questionnaire. The study did not include a control group.

**Questionnaire**

The questionnaire was original. The primary aim was to assess whether the patient had been vaccinated against SARS-CoV-2,
**Table 1. Vaccination questionnaire.**

| Question                                                                 | Answer |
|--------------------------------------------------------------------------|--------|
| Question 1. What kind of IBD do you have?                                |        |
| Question 2. In what year was IBD diagnosed?                              |        |
| Question 3. What medications do you take because of IBD?                 |        |
| Question 4. Have you ever been operated on due to IBD? If so, how many times? |        |
| Question 5. What medications do you take for other gastroenterological diseases? |        |
| Question 6. Do you suffer from any other chronic diseases, apart from gastrointestinal diseases? |        |
| Question 7. In addition to the above-mentioned, do you take other medications chronically? |        |
| Question 8. Have you ever suffered from COVID-19?                         |        |
| Question 9. If so, how severe was the course of the disease?              |        |
| Question 10. Have any of your relatives with whom you live suffered from COVID-19? |        |
| Question 11. If so, how severe was the course of the disease?             |        |
| Question 12. Are you vaccinated against COVID-19?                         |        |
| Question 13. Why did you decide to be vaccinated against COVID-19? (multiple answers possible) |        |
| Question 14. Who recommended you be vaccinated against COVID-19?           |        |
| Question 15. Did you need a medical certificate from a gastroenterologist or other specialist authorising vaccination against COVID-19? |        |
| Question 16. Did you inform the gastroenterologist about the vaccination? |        |
| Question 17. Were you afraid of being vaccinated against COVID-19?         |        |
| Question 18. Are your family or people with whom you live vaccinated?     |        |
| Question 19. Are friends and colleagues vaccinated?                       |        |
| Question 20. Why did you decide not to get vaccinated against COVID-19? (multiple answers possible) |        |
| Question 21. Have you been vaccinated against influenza?                  |        |
| Question 22. Have you been vaccinated against pneumococcus?               |        |
| Question 23. Have you been vaccinated against hepatitis B?                |        |
| Question 24. Have you been vaccinated against other infectious diseases in adulthood? |        |
| Question 25. Sex                                                         |        |
| Question 26. Age                                                         |        |
| Question 27. Smoker                                                      |        |
| Question 28. Consume alcohol                                             |        |
| Question 29. Education                                                   |        |
| Question 30. Place of residence                                          |        |
| Question 31. Average net income per person in the household              |        |
| Question 32. Employment                                                  |        |

IBD – inflammatory bowel disease.
and then to establish the main reasons for the decision to be vaccinated or not. The arguments most frequently appearing in the public debate were selected as possible answers, but the respondents also had the opportunity to describe their own reasons in an open question. The questionnaire was not based on another known, validated questionnaire. It was prepared in Polish and contained the following groups of questions: the history and treatment of IBD, the patient's experience with the SARS-CoV-2 virus (symptomatic or asymptomatic infection in the patient or their relatives, vaccination among relatives and household members), demographic data (age, place of residence, assessment of socioeconomic status) and other health behaviors (eg, other recommended vaccinations, smoking). The questions asked are presented in Table 1.

### Statistical Analysis

The chi-square test (with Yate's correction for continuity for 2×2 tables) or Fisher's exact test were used to analyse the relationship between 2 qualitative variables (n and% were given), and the Mann-Whitney U test was used to compare the values of quantitative variables (the median with quartiles 1 and 3 were given). The median differences and odds ratios were calculated with 95% confidence intervals. The normality of the distributions of quantitative variables was checked with the Shapiro-Wilk test. The analysis was performed using R statistical software, version 4.2.1 (with α=0.05).

### Results

#### Study Population

Of the 267 patients who completed the questionnaire, 50.6% were women. The average age was 34 years. Current smoking was declared by 14.6% and 36.7% stated they had been smokers in the past. Alcohol consumption was declared by 24.4%. Most of the responders were residents of very large cities with over 100 000 inhabitants (55.1%) and most had higher education (62.8%). Most of them were working people (54.0%), with middle income.

CD was diagnosed in 59.9% of patients, and UC in 40.1%. The mean duration of IBD was 11 years. Mesalamine had been received by 77.8% of the patients, 54.4% had received thiopurines, 23.8% had received steroids, and 60.2% had received biologics. Surgery for IBD had been undergone by 34.1%, with an average of 2 operations.

The detailed characteristics of the group are presented in Tables 2 and 3.

#### History of COVID-19

Of the study participants, 22.6% reported a history of COVID-19, mostly mild or moderate (43.3% and 51.7%, respectively). A history of SARS-CoV-2 infection among the family was reported by 29.2%. Similarly, most infections were moderate and mild (53.3% and 33.3%, respectively).

#### COVID-19 Vaccination

Vaccination had been received by 71.2% of the patients. The majority (72.3%) decided by themselves to get vaccinated, while for 26.6%, the vaccination was prescribed by a doctor. Most had no concerns about vaccination (52.4%). Of the patients who got vaccinated despite their fears, none mentioned the mass media as being the factor that convinced them to do so. The vast majority of patients were not vaccinated against influenza (83.3%) or pneumococci (87.5%), while 71.4% were vaccinated against hepatitis B.

The detailed history of COVID-19 is presented in Table 4.

The influence of various factors on vaccination was studied in detail. Among IBD-dependent factors, only steroid use was found; significantly fewer vaccinated patients were steroid users compared to the unvaccinated groups (19.8% vs 33.8%; \( P = 0.028 \)).

Regarding demographic factors, there was no relationship between vaccination and sex, and in the vaccinated group the mean age was significantly higher (36 years vs 32.5 years in the unvaccinated group; \( P = 0.011 \)).

No influence of other health behaviors (eg, alcohol consumption, smoking cessation) was found. In the vaccinated group there were more people with higher education (68.4% vs 47.4%; \( P = 0.005 \)), inhabitants of very large cities (52.3% vs 23.4%; \( P < 0.001 \)), and people with the highest income (21.3% vs 5.5%; \( P = 0.008 \)).

A history of COVID-19 disease was associated with a lower vaccination rate (16.9% vs 36.8%; \( P = 0.001 \)), regardless of disease severity, while family history of COVID-19 was found to have no effect. The impact of vaccinations among relatives and friends on the decision to be vaccinated was significant. In the vaccinated group, there were significantly more vaccinated people among household members (90.4% vs 43.4%; \( P < 0.001 \)) and friends (52.9% vs 22.4%; \( P < 0.001 \)). Influenza vaccination was also more common among those vaccinated against COVID-19 (19.6% vs 9.5%; \( P = 0.008 \)), while other vaccinations did not have such an effect. The detailed results are presented in Table 5.
Table 2. Group characteristics – demographic data.

| Variable               | Value, n (%) |
|------------------------|--------------|
| Sex (female)           | 134 (50.6)   |
| Age                    | 34.00 (28.00; 42.00)* |
| Smoker                 |              |
| No                     | 130 (48.7)   |
| Yes, currently         | 39 (14.6)    |
| Yes, in past           | 98 (36.7)    |
| Drink alcohol          |              |
| No                     | 94 (35.9)    |
| Yes, currently         | 64 (24.4)    |
| Yes, in past           | 104 (39.7)   |
| Education              |              |
| Primary                | 7 (2.6)      |
| Secondary              | 92 (34.6)    |
| Higher                 | 167 (62.8)   |
| Place of residence     |              |
| Countryside            | 55 (20.6)    |
| City <20 000 inhabitants | 17 (6.4)    |

* 95% CI.

Table 3. Group characteristics – history of IBD.

| Variable               | Value, n (%) |
|------------------------|--------------|
| Group                  |              |
| Ulcerative colitis     | 107 (40.1)   |
| Crohn’s disease        | 160 (59.9)   |
| Duration of disease (years) | 11 (6; 15)* |
| Medication used        |              |
| Mesalamine             | 203 (77.8)   |
| Sulfasalazine          | 21 (8.0)     |
| Steroids               | 62 (23.8)    |
| Thiopurines            | 142 (54.4)   |
| Methotrexate, cyclosporine | 8 (3.1)    |
| Infliximab, vedolizumab, adalimumab, ustekinumab | 157 (60.2) |
| Tofacitinib            | 10 (3.8)     |
| Other                  | 1 (0.4)      |
| Surgical interventions | 91 (34.1)    |
| Number of operations   | 2.00 (1.00; 3.00)* |

IBD – inflammatory bowel disease; * 95% CI.

Reasons for COVID-19 Vaccination

Family safety was mentioned as the most common reason for vaccination among those vaccinated (71.1%). The most frequently mentioned reasons were the desire to avoid COVID-19 (67.9%), social responsibility (60.5%), the desire to return to normal life (51.6%), and faith in vaccination as such (43.2%).
was significant (23.7%). The percentage of patients who self-diagnosed contraindications to vaccination was 22.4%. A small number of patients cited various conspiracy theories as the cause of non-vaccination (eg, there is no pandemic, vaccination does not work – both 2.6%).

The reasons for receiving or refusing the vaccination are presented in Table 6.

### Discussion

In our study, 71.2% of the IBD patients had been vaccinated against COVID-19. The history of COVID-19 disease was associated with a lower vaccination rate (16.9% vs 36.8%; P=0.001), regardless of disease severity. In the vaccinated group, there were significantly more vaccinated people among household members (90.4% vs 43.4%; P<0.001) and friends (52.9% vs 22.4%; P<0.001). Family safety (71.1%), the desire to avoid COVID-19 (67.9%), social responsibility (60.5%), the desire to return to normal life (51.6%), and faith in vaccination as such (43.2%) were the most common reasons for vaccination. The most common reason for non-vaccination was concern about adverse effects (50.0%), including long-term adverse effects (36.8%), and about the possible exacerbation of gastrointestinal disease (34.2%).

So far, the available data on vaccination against COVID-19 in the IBD population are inconclusive. Our results agree with those of previous studies in which a higher percentage of vaccinated patients was found among IBD patients.
Table 5. Analyses of relationships between vaccination and selected variables.

| Variable                        | Not vaccinated | Vaccinated | MD/OD 95% CI          | p     |
|---------------------------------|----------------|------------|-----------------------|-------|
| Group                           |                |            |                       |       |
| Ulcerative colitis              | 29 (37.7)      | 78 (41.1)  | 0.87 (0.50; 1.49)     | 0.708 |
| Crohn's disease                 | 48 (62.3)      | 112 (58.9)|                       |       |
| Duration of disease (years)     | 11.00          | 11.00 (6.00; 14.00) | 0.00 (-2.00; 2.00) | 0.813**|
| Medication used                 |                |            |                       |       |
| Mesalamine                      | 57 (77.0)      | 146 (78.1)| 1.06 (0.56; 2.02)     | 0.985 |
| Sulfasalazine                   | 6 (8.1)        | 15 (8.0)   | 0.99 (0.37; 2.65)     | >0.999|
| Steroids                        | 25 (33.8)      | 37 (19.8)  | 0.48 (0.27; 0.88)     | 0.026 |
| Thiopurines                     | 40 (54.1)      | 102 (54.5)| 1.02 (0.59; 1.75)     | >0.999|
| Methotrexate, cyclosporine      | 1 (1.4)        | 7 (3.7)    | 2.84 (0.34; 23.48)    | 0.447*|
| Infliximab, vedolizumab,        | 49 (66.2)      | 108 (57.8)| 0.70 (0.40; 1.22)     | 0.263 |
| adalimumab, ustekinumab         | 2 (2.7)        | 8 (4.3)    | 1.61 (0.33; 7.76)     | >0.999*|
| Other                           | 0 (0.0)        | 1 (0.5)    | –                     |       |
| Surgical interventions          | 28 (36.4)      | 63 (33.2)  | 0.87 (0.50; 1.51)     | 0.720 |
| Number of operations            | 2.00 (1.00; 3.50) | 2.00 (1.00; 3.00) | 0.00 (<-0.01; 1.00) | 0.931**|
| Comorbidities                   | 16 (21.3)      | 72 (38.1)  | 1.33 (0.76; 2.35)     | 0.392 |
| A history of COVID-19           | 28 (36.8)      | 32 (16.9)  | 0.35 (0.19; 0.64)     | 0.001 |
| Severity of infection           |                |            |                       |       |
| Asymptomatic                    | 1 (3.6)        | 1 (3.1)    |                       |       |
| Light                           | 15 (33.6)      | 11 (34.4)  | –                     | 0.158*|
| Medium                          | 11 (39.3)      | 20 (62.5)  |                       |       |
| Severe                          | 1 (3.6)        | 0 (0.0)    |                       |       |
| COVID-19 history among family   | 29 (38.2)      | 48 (25.5)  | 0.56 (0.32; 0.98)     | 0.058 |
| Vaccinations (household members)|                |            |                       |       |
| No                              | 21 (27.6)      | 6 (3.2)    |                       |       |
| Yes                             | 33 (43.4)      | 169 (90.4)| –                     | <0.001|
| Not everyone                    | 22 (28.9)      | 12 (6.4)   |                       |       |
Table 5 continued. Analyses of relationships between vaccination and selected variables.

| Variable                                      | Not vaccinated | Vaccinated | Me (Q1; Q3)/n (%) | MD/OR 95% CI | p    |
|-----------------------------------------------|----------------|------------|-------------------|--------------|------|
| Vaccinations (friends)                        |                |            |                   |              |      |
| No                                            | 6 (7.9)        | 1 (0.5)    |                   |              |      |
| Yes                                           | 17 (22.4)      | 100 (52.9) |                   |              | <0.001* |
| Not everyone                                  | 53 (69.7)      | 88 (46.6)  |                   |              |      |
| Influenza vaccination                          |                |            |                   |              |      |
| No                                            | 67 (90.5)      | 152 (80.4) |                   |              |      |
| Yes, vaccinated every year                     | 0 (0.0)        | 16 (8.5)   |                   |              | 0.008* |
| Yes, first vaccination in 2020                 | 0 (0.0)        | 7 (3.7)    |                   |              |      |
| Yes, vaccinated every few years                | 7 (9.5)        | 14 (7.4)   |                   |              |      |
| Pneumococci vaccination                       | 8 (11.0)       | 24 (13.2)  | 1.23 (0.53; 2.89) | 0.782        |      |
| Hepatitis B vaccination                        | 32 (69.6)      | 105 (71.9) | 1.12 (0.54; 2.31) | 0.904        |      |
| Other vaccinations                             | 7 (9.5)        | 37 (19.8)  | 2.36 (1.00; 5.57) | 0.068        |      |
| Sex (female)                                  | 35 (45.5)      | 99 (52.7)  | 1.33 (0.78; 2.27) | 0.352        |      |
| Age                                           | 32.50 (26.00; 38.00) | 36.00 (28.00; 44.00) | 3.50 (-1.00; 6.00) | 0.011        |      |
| Smoker                                        |                |            |                   |              |      |
| No                                            | 39 (50.6)      | 91 (47.9)  |                   |              |      |
| Yes, currently                                | 11 (14.3)      | 28 (14.7)  |                   |              | 0.917 |
| Yes, in past                                  | 27 (35.1)      | 71 (37.4)  |                   |              |      |
| Drink alcohol                                 |                |            |                   |              |      |
| No                                            | 25 (32.9)      | 69 (37.1)  |                   |              |      |
| Yes, currently                                | 15 (19.7)      | 49 (26.3)  |                   |              | 0.244 |
| Yes, in past                                  | 36 (47.4)      | 68 (36.6)  |                   |              |      |
| Education                                     |                |            |                   |              |      |
| Primary                                       | 4 (5.3)        | 3 (1.6)    |                   |              |      |
| Secondary                                     | 35 (46.1)      | 57 (30.0)  |                   |              | 0.005* |
| Higher                                        | 37 (48.7)      | 130 (68.4) |                   |              |      |
| Place of residence                            |                |            |                   |              |      |
| Countryside                                   | 21 (27.3)      | 34 (17.9)  |                   |              |      |
| City <20 000 inhabitants                      | 4 (5.2)        | 13 (6.8)   |                   |              |      |
| City 20 000-100 000 inhabitants                | 18 (23.4)      | 30 (15.8)  |                   |              | <0.001* |
| City 101 000-499 000 inhabitants               | 16 (20.8)      | 13 (6.8)   |                   |              |      |
| City >500 000 inhabitants                     | 18 (23.4)      | 100 (52.6) |                   |              |      |
In an Italian study by Castantino et al [12], the willingness to be vaccinated was investigated in a group of IBD patients. Conducted in February 2021, the study found a high proportion of patients willing to undergo vaccination (80.3%). Among those who hesitated, concerns about the safety and efficacy of vaccines in the IBD group prevailed, and the argument that the vaccine was developed too quickly was one of the most common reasons. Moreover, men with higher education were more willing to be vaccinated.

In a study from the USA, Delal et al [13] assessed the willingness to be vaccinated between December 2020 and January 2021, finding that in the IBD group a higher percentage of people (80.9%) wanted to be vaccinated. Among the fears reported by undecided persons, the most frequent was the fear of long-term adverse effects (64.4%). The factors related to the willingness to be vaccinated were age over 50 years, a university education, as well as a history of COVID-19 disease and biological treatment.

In a study from France by Caron et al [11], 54.8% of IBD patients said they would be vaccinated against COVID-19, similar to the general population. Among the patients who wanted to be vaccinated, the most common reasons were belief in the effectiveness of the vaccine and social responsibility. Concerns about vaccine safety were cited as a reason for not vaccinating.

The observed results were as expected. Patients with IBD, due to the chronic nature of the disease, which is usually diagnosed at a young age, are a very aware and well-educated group of patients [17,18]. Patients often independently look for information about their disease and treatment options, and are good partners in the treatment process. We expected this to be the case in the COVID-19 pandemic as well, especially since IBD patients are often treated with immunosuppressants, and in the early stages of the pandemic many concerns were expressed about the possibility of more frequent disease and a more severe course of COVID-19 in this group of patients. Most of these fears have not materialized [9,19]. It has not been established that patients with IBD, including those taking immunosuppressants (except high-dose steroids), are more likely to experience severe COVID-19 [20-22]. Moreover, there is evidence that some drugs that modulate the immune response are protective in nature. Nevertheless, all IBD research societies recommend vaccination against COVID-19 for all IBD patients [23-26].

However, there are also studies in which IBD patients were found to be more skeptical about vaccination. A Chinese study...
Wu et al [15] reported that only 16% of IBD patients wanted to be vaccinated, citing concerns similar to those found in other studies: fear of adverse effects and doubts about vaccine efficacy.

Similarly, in a study by Dai et al [14], also from China, carried out during the vaccination campaign, only 38.5% of IBD patients were vaccinated; among these, most wanted to avoid infection and return to normal life (80.3% and 70.2%, respectively). Concerns about adverse effects were the main argument of the unvaccinated (88.0%).

In a study from Germany by Walldorf et al [16], conducted in January and February 2021, there was a lower percentage willing to be vaccinated or already vaccinated in the IBD patient group compared to the control group (58.5% vs 65.1%; P=0.013). In that study, higher vaccination rates against influenza did not translate into greater acceptance of vaccination against COVID-19.

Our study identified several factors that contributed to vaccination. These included older age, vaccinations among family and friends, vaccinations against other diseases (eg, influenza vaccination). Residents of large cities, people who were better educated, and those with higher income, were also more likely to have been vaccinated. Younger people, inhabitants of villages and small towns, those with less education, and those with lower income were less likely to get vaccinated. From the data collected, a picture emerges of 2 main groups that did not want to be vaccinated. The first group consists of young people, living with a sense of health, who, based on media reports and information from other sources, have built a false belief that they are immune to the virus and that there is no need for vaccination. The second group includes people with less education and lower socioeconomic status, who, regardless of age, were also unable to be persuaded to be vaccinated.

These data are consistent with the available Polish surveys, as well as with surveys carried out in other countries.

Table 6. Reasons for receiving or refusing the vaccination.

| Variable | Value, n (%) |
|----------|-------------|
| Vaccine was invented too quickly | 18 (23.7) |
| Exacerbation of gastrointestinal disease (patient themself stated contraindications) | 17 (22.4) |
| History of COVID-19 | 17 (22.4) |
| Exacerbation of gastrointestinal disease (gastroenterologist stated contraindications) | 11 (14.5) |
| Did not know if they can be vaccinated | 8 (10.5) |
| Exacerbation of gastrointestinal disease (another doctor stated contraindications) | 7 (9.2) |
| High levels of antibodies | 7 (9.2) |
| Does not trust pharmaceutical industry | 6 (7.9) |
| Believes there is no need to vaccinate | 5 (6.6) |
| Not at increased risk | 3 (3.9) |
| Does not know how long the protection works for | 3 (3.9) |
| Has other contraindications (shock, allergic reaction) | 3 (3.9) |
| Does not believe in pandemic | 2 (2.6) |
| Vaccine will not work | 2 (2.6) |
| Doctor did not recommend | 0 (0.0) |
| Other reasons | 0 (0.0) |
Wisniak et al assessed willingness to be vaccinated in the canton of Geneva [27], finding greater acceptance of vaccinations among the elderly, men, those with high income, and people living in urban and semi-urban areas. Acceptance was lower in those with less education. Participants were also asked why they wanted to be vaccinated, and the most common responses were willingness to return to normal life and to protect themselves, their community, and their relatives or friends against the risk of infection.

In a similar study from France, Detoc et al found that 77.6% of the more than 3000 people surveyed had been vaccinated against COVID-19. The factors increasing acceptance of vaccinations were: older age, male sex, fear about COVID-19, being a healthcare worker, and individual perceived risk of infection. Vaccine hesitancy was a factor reducing acceptance of vaccination against COVID-19 [28].

The main reasons for vaccination, in our study, were the conviction that it is necessary to protect relatives and oneself, as well as responsibility for the health of the whole of society. Most people who received vaccination were convinced of the safety of vaccinations in general. The main reasons for not vaccinating were safety concerns, especially the risk of adverse effects, including long-term adverse effects, and exacerbation of the current disease state. The high percentage of people who do not trust the world of science should be emphasised, as evidenced by the fear of the short time it takes to invent a vaccine and a lack of trust in vaccination in general. Fortunately, the proportion of patients who refuse to be vaccinated because of conspiracy theories is relatively small.

It is also important that the environment – family and friends – has a large effect on decisions about vaccination. As can be seen from these results, the influence of relatives is very large and exceeds the influence of the official position of the authorities and the recommendations of doctors. This is another difficulty in promoting vaccination to those yet unconvinced.

Healthcare professionals are assigned a major role in promoting vaccination. On the one hand, we observe a fairly large percentage of vaccinated people who, although fearing vaccination, were convinced by their doctors. On the other hand, it is very worrying that there is a high percentage of unvaccinated people who give contraindications stated by doctors as their reason (23.7%), as well as the need to present certificates from specialists before qualifying for vaccination. Medical science considers vaccination to be very safe and only lists a few situations in which vaccination is contraindicated. This is why such a high percentage of contraindications reported by physicians should be alarming and lead to very intensive actions aimed at better education among physicians, so that they can be advocates of vaccination, and not cause doubts that can be easily interpreted as a voice against vaccination.

There is also a very small percentage of patients who are convinced by the mass media and family. These data show how difficult it is for the various types of media and social campaigns and that their effectiveness is low. Therefore, consideration should be given to the greater role of other methods for raising awareness about vaccination. Based on our data, as well as on other data collected from around the world, education should be the primary consideration, not just knowledge gained from a TV screen or a computer, but solid education that begins at school, providing grounds for trusting the world of science, which will be resistant to misinformation and will allow people to fully benefit from the possibilities of modern medicine. Unfortunately, the effects of such an approach will be visible only in the long term.

Limitations

Our study has several limitations. Our sample size was small and included a large percentage of patients with a more severe course of IBD and those whose condition requires a personal visit to the medical center. This is seen in the very high percentage of biologically treated patients. Therefore, patients with a severe course of the IBD, who have more contact with the health service during a pandemic, were qualified for our study. In our study it was not possible to select a control group consisting of people without IBD because, at the time of the study, there were significant restrictions on access of unvaccinated people to the hospital. The strengths of our work include the fact that it assessed vaccinations already performed, rather than intention to get vaccinated, as in most previous studies. Nevertheless, our study assessed the problems that result in a relatively high percentage of unvaccinated people in the Polish population. As shown in the discussion, there are large cultural and geographic differences in the approach to vaccination, which is why it is so important to understand the mechanisms responsible for the non-acceptance of COVID-19 vaccination in individual populations and in specific groups of patients. The presented data may help better planning for future vaccination campaigns for IBD patients and for the entire population.

Conclusions

The findings from this study showed that patients with a diagnosis of IBD were more likely to be vaccine compliant (71.2%) than the general population in Poland (60%). As in the general population, patients with younger age, low socioeconomic status, low levels of education, and those living in rural areas had lower vaccination rates. Factors that positively influenced the decision to be vaccinated included support from family and friends, but information from the media had no effect on the decision to become vaccinated.
