

## Vaccine Hesitancy During the COVID-19 Vaccination Campaign: a Cross-Sectional Survey among Bulgarian University Students

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### Abstract

The success and timely control of the pandemic depend on the vaccination status of the population. Even when vaccines are available, refusal to vaccinate would doom all health strategies to failure. Our aim was to assess the willingness of Bulgarian university students to take vaccine against COVID-19. More than two hundred and thirty students were enrolled in an anonymous survey. A small percentage (28.63%) would agree to be vaccinated. The majority of them would choose either an RNA or a vector-based vaccine (58.21% vs. 56.72%). Differences between the responses of male and female respondents were noted, as well as between medical and non-medical students. Our results revealed an alarming trend of vaccine refusal. Therefore, immediate measures must be taken to reverse this tendency.

**Keywords:** SARS-CoV-2; COVID-19; vaccine; survey; students.

### Резюме

Успехът и навременното управление на пандемията зависи от ваксинационния статус на населението. Дори когато ваксините са налични, отказът от ваксинация ще обрече всички здравни стратегии на провал. Целта ни бе да оценим готовността за ваксиниране на българските студенти срещу COVID-19. Повече от двеста и тридесет студенти взеха участие в анонимно проучване. Нисък процент (28.63%) биха се съгласили да се ваксинират. Повечето от тях биха избрали или РНК или векторни ваксини (58.21% спрямо 56.72%). Бяха отбелязани различия между отговорите на студентите от мъжки и женски пол, както и между студенти от медицински и немедицински специалности. Нашите резултати показват тревожна тенденция за отказ от ваксинация. Следователно трябва да се вземат незабавни мерки за справяне с нея.

### Introduction

While the pandemic continues and the waves come and go, scientists from all around the world are in a hurry to find a vaccine which will put a stop to the deadly coronavirus and its mutations. The ultimate goal of the medical authorities is to have as many people vaccinated as possible in order to reach high vaccination coverage, especially among those who are most at risk and vulnerable. Manufactured and introduced, even the most effective vaccines cannot achieve their goals if the population does not accept them (MacDonald, 2015).

A year ago, when the virus spread to many countries and a pandemic was declared, everyone hoped that an effective vaccine would be developed as quickly as possible, which would change the course of the mass infection. Now that many vaccines have been developed and put into use, hu-

manity doubts their efficacy, dooming everything achieved (Dror *et al.*, 2020).

Despite the increasing morbidity and mortality rate, there is a growing pressure to proceed from online to hybrid or in-person education at universities. Recently, the Bulgarian government allowed in-person education at universities, which coincided with the end of the academic year. Given the relatively small number of vaccinated Bulgarians, confirmed by the fact that only 3% of the participants in the present study reported that they had been given the vaccine, there will be an increase in cases among the university communities in the next academic year.

The aim of the current study was to assess the likelihood of university students to be vaccinated against COVID-19, their preferences for a vaccine type, and different factors that would influence

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their choice.

## Materials and Methods

This cross-sectional study was conducted as an anonymous survey between 15<sup>th</sup> and 21<sup>st</sup> May, 2021. An online questionnaire consisting of socio-demographic section (including questions about gender, age, current educational level, scientific area, and income) and a section with COVID-19 vaccine questions was administered using Google Forms and was distributed among student groups via a link in the social networks Facebook and Twitter. The respondents were asked to read and fill in an anonymity declaration within the explanation of informed consent statement. Participation was completely free and voluntary, and no personal data were collected from any participant. After processing and analysis, all data were processed in accordance with the General Data Protection Regulation (EU) 2016/679 (GDPR).

All investigated parameters were analyzed with a one-way analysis of variance (ANOVA). *P*-values of less than 0.05 were regarded as statistically significant.

## Results and Discussion

More than two hundred (n=234) students from different Bulgarian universities participated in the current survey (Table 1). Female to male ratio was 1.36. Respondents in the age group 18 - 25 were represented in the largest number. The questions and the data from the survey are presented in Table 2. After the data analysis, it became clear that a large proportion of the participants would not get vaccinated (71.37%) and

only a small number of respondents would accept vaccination (28.63%). When compared, significant differences were found between the responses of healthcare and non-healthcare students (*p*=0.012). These results met our expectations.

Our results differ significantly from studies conducted in Italy and the USA. Only 13.9% (Barello *et al.*, 2020) of the Italian students would refuse a vaccine and 23% (Lucia *et al.*, 2020) of their fellow American students would follow their example. It is assumed that the reason behind the higher rate of students willing to get vaccinated in Italy and the USA is that both of the countries have been hit hard by the novel coronavirus pandemic.

A striking difference was observed between the responses of Bachelor degree students and PhD students, with more than 85% of those studying in the lower academic degree reluctant to take the vaccine, while 71.43% of the PhD students were likely to be vaccinated. This difference is linked to the greater awareness of the PhD students and their open-mindedness.

As for the preferred type of vaccine, the smallest percentage of the participants chose the vaccine with a protein-based antigen (16.12%), while the preferred types of vaccines were the RNA and vector-based (58.21% and 56.72%, respectively) (*p*=0.021). This result probably stems from the fact that RNA and vector-based vaccines are widely discussed and used, while those with protein-based antigens have remained less represented. The lack of protein-based vaccine introduced for mass use possibly contributed to the lower vote.

**Table 1.** Demographic information about respondents (n=234)

Categories		n	%
Gender	Female	135	57.69
	Male	99	42.31
Age groups	18 - 25	169	72.22
	26 - 40	53	22.65
	> 40	12	5.13
Present educational level	Bachelor	157	67.09
	Master	63	26.92
	PhD	14	5.98
Scientific area	Non-medical	206	88.03
	Medical	28	11.97
Income	Low income (< €325 per month)	27	11.54
	Middle income (€325 – €751 per month)	49	20.94
	High income (> €751 per month)	104	44.44
	Unspecified	54	23.08

**Table 2.** Survey questions and data

Questions	n	%
1. Are you willing to get vaccinated against COVID-19?		
Yes	67	28.63
No	167	71.37
2. If “Yes”, what type would you choose? <sup>1</sup>		
RNA-based	39	58.21
Vector-based	38	56.72
Protein-based	11	16.42
3. When choosing a vaccine type, which factors are the most important for you? <sup>1</sup>		
Vaccine type	39	58.21
The country manufacturing the vaccine	35	52.24
The recommendations of the medical authorities and my GP	37	55.22
The side effects	42	62.69
I will comply with the available vaccine at the time of vaccination	33	49.25
None of the listed options	17	25.37
4. If the country manufacturing the vaccine is important for you, which one would you choose? <sup>1</sup>		
USA		20
Countries part of the European Union		25
Great Britain		12
Russian Federation		7
People's Republic of China		2
Other country		3
5. If you are NOT willing to get vaccinated, what would be the reasons for your choice?		
Personal reasons	116	69.46
Medical reasons	44	26.35
Other	7	4.19

<sup>1</sup>Multiple responses possible. Therefore, the total may exceed 100%.

When asked what the most important factor when choosing a vaccine was, a significant gender distribution was observed as to the side effects of the vaccines. Female participants were worried about the adverse reactions in 66.67%.

When comparing the responses of healthcare and non-healthcare students, the former were found to be less concerned about the side effects than the latter (30.21% vs. 67.97%) ( $p=0.019$ ). We believe that this result is due to the better awareness and knowledge of the healthcare students about post-vaccine events. For them the most important factor was the vaccine type (61.42%).

Not only in Bulgaria but also in other countries the concern about the side effects after vaccination might lead to hesitancy (Pogue *et al.*, 2020), a phenomenon which could affect reaching herd

immunity and have an impact on the course of the pandemic. Thus, vaccine hesitancy is recognized as one of the threats to global health by the World Health Organization (Godlee, 2019).

Of all respondents who replied that the most important factor was the country manufacturing the vaccine, the highest percentage chose the European and US vaccines with the UK vaccine remaining further behind. The reason behind these results could be the reports of severe side effects of one particular vaccine. Similar results were reported in an American survey (Pogue *et al.*, 2020).

There was a question about the preferred vaccine brand, however, given the situation with a particular vaccine and the reports about it in society and the media, and the ever-changing situation, we have refrained from providing data and comments

on this matter. Participants who did not want to be vaccinated indicated personal reasons for their choice (69.46%). Most of them were in the group of the non-medical students, while the medical students would refuse vaccination due to medical issues. In February 2021, a sociological survey was conducted in Bulgaria assessing the willingness of the population to be vaccinated or not. Our results are consistent with that survey.

### Conclusions

Our study demonstrates a worrisome tendency to unwillingness to vaccinate. Furthermore, those who refuse the vaccine are mainly non-medical students and in the younger age group, which suggests the need of information campaigns and other additional actions that will raise public awareness and knowledge about the positive effects of the vaccines as a tool for controlling the pandemic.

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