

# **COVID-19 vaccine acceptance among university students in Republic of North Macedonia**

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## **Introduction**

Coronavirus disease (COVID-19) pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has rapidly developed into a worldwide pandemic, having an impact on health and worldwide economical state and significant psychological and social effect on the population. Vaccination is one of the most successful public health interventions for prevention of communicable infectious diseases, but as it is voluntary popular unacceptance is one of the main threats to world health. In the past few years there is a rise in vaccine hesitancy worldwide linked to loss of trust and misinformation about vaccine safety. Numerous factors influence decision making among which available sources of information and trust in the healthcare system have a significant impact on vaccine acceptance.

Most of the young adults and college students use social media platforms to get informed about the vaccines and immunization. Since the decision-making regarding vaccination depends on many individual factors including emotional, cultural, social, spiritual, and political factors, it is important to understand the reason for students' attitudes towards vaccination, in order to find the most effective way to properly inform them about the importance of COVID-19 vaccination.

This study aims to assess the attitude the university students have towards immunization and also assesses the association between the key sources of knowledge about COVID-19 vaccines and its acceptance.

## **Materials and methods**

This was a descriptive, cross-sectional study using an online-based survey in a period from 17 February to 23 April 2021. The target populations were university students who were currently studying at Ss. Cyril and Methodius University in Skopje. The participation in this study was on a voluntary basis. An e-mail with a link to the online survey was sent to all students at the University, and the responses were collected anonymously.

The questionnaire contained a total of 11 questions, divided into three sections. It was created based on a similar survey from a literature review (Salam et al., 2021). The clarity and relevance of the questionnaire was presented and approved by the Department of Pharmaceutical Chemistry at the Faculty of Pharmacy, University of Ss. Cyril and Methodius, Skopje.

The first section aimed at collecting information about faculty division within a university, classified in four academic disciplines (Health, Natural Science, Technical, and Humanities).

The second section investigated the main source of COVID-19 information used by the students, their self-assessed knowledge about COVID-19 vaccination and intention to get COVID-19 vaccine.

The third section of the questionnaire refers to students' general attitudes toward the importance of COVID-19 vaccination and the impact of vaccines on public health.

A descriptive analysis was performed on participant characteristics and acceptance, knowledge, and opinion about COVID-19 vaccination. The analysis was performed using Statistical package MedCalc version 20.111.

Qualitative data were expressed as percentages, and Chi-square test was used to assess the statistical significance of the association between the intention for COVID-19 vaccination and following variables: academic disciplines and main source of information. A p-value < 0.05 was considered statistically significant.

## Results and discussion

The total number of respondents included in final analysis was 5176 students. The participant students belonged to a total of 25 faculties with academic discipline distribution: Health (26.4 %), Technical (30.4%), Humanities (37.1%) and Natural Science (6.2%).

Most of the students (56.8%) reported that they plan to get a vaccine whenever it is available. Higher percentage of students who agreed to take the vaccine was from the faculty academic discipline "Health" (67.3%), compared to other disciplines "Humanities" (50.1%), "Technical (57.3%) and "Natural Science" (49.8%),  $p < 0.001$ . These results confirmed that students from faculty academic discipline "Health" were the most willing to be vaccinated, which is comparable to the results described in previously conducted similar study (Tavolacci et al., 2021).

We assume that greater knowledge and education of students from academic discipline "Health" regarding immunization, have a positive impact on COVID-19 vaccine acceptance. Compared to non-health students, a higher percentage of health students considered themselves sufficiently informed regarding COVID-19 vaccination (12.8% vs. 7.6%,  $p < 0.0001$ ). Almost all health students (91.4%) stated that vaccination is an important part of public health, compared to non-health students (82.5%,  $p < 0.0001$ ), and the majority of them are willing to advise their family and friends to get vaccinated (65.6% vs 47.0%,  $p < 0.0001$ ).

Regarding factors that influenced vaccination decision, both group of students ranged vaccine efficacy (65.5% vs 54.3%) and safety (76.4% vs 73.8%) as the most important factors. The most common reasons for those who refused to get the vaccine (10.7%) were insufficient information about COVID vaccines (6.5%), concern about safety profile (49.2%) and personal attitudes (43.6%). The number of students who stated that they need more information and who are concern about the side effects of COVID-19 vaccines was higher in non-health students group (84.5%, 82.9% respectively)

compared to health students group (15.5%, 17.1% respectively), but without any statistical significance ( $p = 0.6547$ ).

Despite education, the source of information can also affect the attitude toward COVID-19 vaccination. The overall intention to get COVID-19 vaccine was highest among students who reported dependence on relevant institutions (71.6%), and healthcare professionals (67.4%). The lowest rate of intention to receive the vaccine was among those students who relied on social media platforms (45.0%,  $p < 0.001$ ). This shows that healthcare professionals have a central role in discussing vaccination against COVID-19 with their patients.

## Conclusion

Results from this survey showed a relatively positive acceptance rate of the COVID-19 vaccines among the university students. However, vaccine hesitancy usually arises due to a concern or doubt about the safety of vaccination. The source and quality of information are critical factors that influence vaccination hesitancy. Therefore, this finding can be used to support the idea that university students studying health sciences, such as those studying medicine, dentistry, pharmacy, and veterinary medicine, should play a part in dissemination of accurate information about COVID-19 vaccination among their colleagues and the general public.

## References

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