

## Intentions towards COVID-19 Vaccination among Adults with Cystic Fibrosis: A Report from a Highly Affected Region in Europe

Andrea Gramegna<sup>1,2\*</sup>, Francesco Bindo<sup>1,2</sup>, Andrea Costantino<sup>3</sup>, Martina Contarini<sup>2</sup>, Francesco Amati<sup>2</sup>, Stefano Aliberti<sup>1,2</sup>, Francesco Blasi<sup>1,2</sup>

<sup>1</sup>Department of Pathophysiology and Transplantation, University of Milan, Milan, Italy; <sup>2</sup>Internal Medicine Department, Respiratory Unit and Cystic Fibrosis Adult Center, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy; <sup>3</sup>Department of Gastroenterology, Gastroenterology and Endoscopy Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

### ABSTRACT

**Background:** Hesitancy to COVID-19 vaccination can be a major obstacle for the control of viral diffusion in individuals with frail conditions. This study was aimed to investigate intention to get vaccinated in a large cohort of adults with CF from a highly affected region in Northern Italy.

**Methods:** Adults with CF from a single center in Milan, Italy were enrolled from January, 25 to February, 15 2021, by a web-based survey investigating patient attitude towards COVID-19 vaccination.

**Results:** The rate of vaccine acceptance was 85% and most common reasons for hesitancy were safety issues (14.7%) and the speed of vaccine development (14.7%). Patients unwilling to be vaccinated were more likely to be older, with lower education and to believe that CF may impair vaccine efficacy or increase adverse events in comparison to those who would accept the vaccine.

**Conclusions:** Future research should aim at monitoring evolution of hesitancy in CF population and identify proper solutions.

**Keywords:** SARS-CoV-2; COVID-19; Vaccination; Cystic fibrosis; Patient-reported outcomes

### INTRODUCTION

Coronavirus Disease 19 (COVID-19) pandemic is imposing unprecedented burden of mortality and health-related costs around the world and infection control measures are only partially effective in containing the spread of the virus [1,2]. The implementation of a large-scale vaccination program is one of the most relevant unmet needs in the global management of this pandemic [3]. However, public acceptance of COVID-19 vaccination is far from being universal in the general population [4]. Mistrust about vaccination can be a major obstacle for the control of viral diffusion and a better understanding of vaccine hesitancy across different population subgroups is urgent to promote proper interventions. Cystic Fibrosis (CF) is one of the frail conditions rising concerns for severe disease since the early stage of the pandemic [5,6]. Individuals with CF are recommended for priority access to COVID-19 vaccination in Italy. However, their predisposition and potential acceptance rate is currently unknown.

The aim of this study was to investigate intention to get vaccinated and attitudes towards COVID-19 vaccination in a large cohort of adults with CF from a highly affected region in Northern Italy.

### METHODOLOGY

Adults (aged  $\geq 18$  years old) with CF were enrolled from January, 25 to February, 15 2021, at the Adult CF Center, IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Lombardy (Italy). An anonymous web-based survey was designed using the platform Euro survey and sent to patients enrolled. Three sections were investigated: demographics, source of information's about COVID-19 vaccines and patients' attitudes towards COVID-19 vaccination, including willingness to get vaccinated. The study was approved by local IRB. Qualitative and non-parametric quantitative variables were summarized with frequencies and medians (Interquartile Ranges, IQR), respectively. Differences between groups were assessed with chi-squared for qualitative variables and with Mann-Whitney for non-parametric quantitative variables, respectively. A two-tailed p-value was considered statistically significant when less than 0.05. All statistical computations were performed with IBM SPSS, Statistics for Mac, version 22.0.

### RESULTS

The survey was sent to 260 adults with CF with a total of 102

**Correspondence to:** Andrea Gramegna, MD, Department of Pathophysiology and Transplantation, University of Milan, Respiratory Unit and Cystic Fibrosis Adult Center, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, via Francesco Sforza 35, 20122, Milan, Italy, Tel: +390250320627; Email: andrea.gramegna@unimi.it

**Received:** April 28, 2021; **Accepted:** May 13, 2021; **Published:** May 20, 2021

**Citation:** Gramegna A, Bindo F, Costantino A, Contarini M, Amati F, Aliberti S et al. (2021) Intentions towards COVID-19 Vaccination among Adults with Cystic Fibrosis: A Report from a Highly Affected Region in Europe. *J Vaccines Vaccin.* 12:469.

**Copyright:** © 2021 Gramegna A, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

respondents (median [IQR] age: 42 [35-50] years; 59.8% male) resulting in a response rate of 39.2%. Among respondents, 35 (34%) of patients were living in the metropolitan area and 37 (36%) had a university degree. Overall, 85 (83%) patients reported optimal adherence to medical prescriptions and 80 (79%) managed their therapies with no need of care-givers. A history of at least one hospitalization for severe exacerbation in the previous year and last ppFEV1<50 accounted for 23 (22%) and 25 (24%) of the cohort, respectively. Among patients who felt adequately informed about COVID-19 vaccination, the most preferred sources of information's were: physicians and allied professionals of the CF Center (45%); general practitioners (36%); ministry of health (20%); mass media e social networks (15%).

Overall, the rate of acceptance of COVID-19 vaccination was 85%. Most common reasons for refusal were general safety issues in 15 (14.7%), the excessive speed of vaccine development in 15 (14.7%) and no fear of COVID-19 in 4 (4%) patients. Among those unwilling to get vaccinated, 12 patients (75% of the group) stated that they would accept COVID-19 vaccination after the disclosure of more data regarding long-term efficacy and safety.

Significant differences in terms of age (40 [34-48] versus 50 [40-52],  $p=0.033$ ), higher degree of education (43% versus 6%,  $p=0.005$ ) and proactive attitude towards health information (85% versus 62%,  $p=0.021$ ) were observed between the two groups of patients willing and unwilling to get vaccinated against SARS-CoV-2, as reported in Table 1.

Patients' perceptions about the interactions between CF and the risk of being infected or developing severe COVID-19 disease are shown in Table 1. Patients unwilling to be vaccinated were more likely to believe that the underlying condition may impair vaccine efficacy or increase adverse events in comparison to those who would accept the vaccine (37% versus 3%,  $p<0.0001$ ; and 62% versus 8%,  $p>0.0001$ , respectively).

## DISCUSSION

The acceptance rate for COVID-19 vaccination in our cohort of adults with CF exceeds 80% with the most frequent reasons for vaccine refusal being general safety issues towards vaccinations and speed of development for COVID-19 vaccines. Among respondents younger age, university degree and high level of information are likely to predict willingness to accept COVID-19 vaccination. Those unwilling to get vaccinated are more likely to believe that the underlying CF might reduce the efficacy and/or increase the risk of vaccine-related adverse events.

The acceptance rate of our cohort was higher in comparison to what reported for general population both at a global and an Italian level (85% versus 71.5% and 65.2%, respectively) [4,7].

Despite several months have passed and mass vaccination is ongoing in most of countries, it is worth to note that lack of studies still affects our understanding of the matter. As a point of comparison with other individuals with underlying chronic conditions, we could not find similar reports for chronic respiratory diseases. However, we found that vaccine acceptance in our cohort was higher than reported for other chronic conditions (85% in CF versus 66% and 65.5% in multiple sclerosis and inflammatory bowel syndromes, respectively) [8,9].

The main reasons for the high acceptance rate might be found in: the setting in a region with one of the highest COVID-19 burdens in Europe and the timing of our investigation, when COVID-19 vaccination is no longer hypothetical, but vaccination campaign is currently on-going. In addition, we also measured where adults with CF got their COVID-19 information and observed that CF consultant and general practitioner were among the most frequent sources. The under-representation of social media and uncontrolled platforms in comparison to what expected is consistent with the high acceptance rate for vaccination.

**Table 1:** Willingness to get vaccinated against COVID-19 among groups.

| Variables  | Willing (n=86) | Unwilling (n=16) | p       |
|--|----------------|------------------|---------|
| <b>Demographics</b>  |                |                  |         |
| Male sex   | 51 (59)        | 10 (62)          | 0.81    |
| Age, years   | 40 (34-48)     | 50 (40-52)       | 0.033   |
| Living in metropolitan area  | 31 (36)        | 5 (31)           | 0.709   |
| University degree  | 37 (43)        | 1 (6)            | 0.005   |
| Proactive attitude towards information                                       | 73 (85)        | 10 (62)          | 0.021   |
| <b>Clinical status</b>   |                |                  |         |
| ppFEV1<50%   | 22 (25)        | 4 (23)           | 0.708   |
| >1 hospitalisation in the previous year                                      | 21 (24)        | 3 (21)           | 0.556   |
| Living with a care-giver   | 74 (86)        | 14 (87)          | 0.619   |
| <b>Patient perceptions</b>   |                |                  |         |
| CF might increase the risk of SARS-CoV-2 infection                           | 52 (60)        | 11 (69)          | 0.779   |
| CF might increase the risk of COVID-19 severe disease                        | 80 (93)        | 13 (81)          | 0.111   |
| Chronic treatments for CF might increase the risk of SARS-CoV-2 infection    | 6 (7)          | 1 (6)            | 0.345   |
| Chronic treatments for CF might increase the risk of COVID-19 severe disease | 8 (9)          | 2 (12)           | 0.432   |
| CF might decrease the efficacy of COVID-19 vaccination                       | 3 (3)          | 6 (37)           | <0.0001 |
| CF might increase the rate of adverse events after COVID-19 vaccination      | 7 (8)          | 10 (62)          | <0.0001 |

In our cohort we confirmed that subjects with high level of instruction and information were those more likely to accept COVID-19 vaccine [4]. On the other side, while older age groups from the general population were more likely to accept the vaccine, we observed that younger patients in our cohort had a more proactive attitude than people with older age [4,7].

Regarding those unwilling to get vaccinated, the findings that a passive attitude towards information and doubts on vaccine development result as the principal causes of hesitancy, may contribute to reshape current communication strategies from both CF centers and patient associations. However, the information that CF is believed to be detrimental for vaccine efficacy and safety suggests a deep and well-structured prejudice. Further data regarding the acceptance rate of traditional vaccines in CF might contribute to clarify this matter.

This study has both strengths and limitations. Although this is the first report on COVID-19 vaccine acceptance among adults with CF, this is a cross-sectional point-prevalence analysis dated at the beginning of 2021. Since then, public opinion regarding vaccines has continued to evolve in light of the approval of new candidates or further data under the safety profile [10,11]. Furthermore, we cannot exclude a selection bias in the event that those who responded to the survey were also those best oriented to vaccination.

## CONCLUSION

To conclude, the acceptance rate of COVID-19 vaccine is high among adults with CF, although a minority of patients is still hesitant. Future research should aim at confirming our findings in different cohorts across other European countries in order to monitor further evolution of hesitancy and identify proper strategies to address it.

## AUTHORS' CONTRIBUTIONS

Conceptualization: AG, AC, SA, FB. Data curation and formal analysis: AG, MC, FB. Methodology: AG, AC. Writing - original draft: AG, FA. Writing - review and editing: AG, FA, MC. All authors read and approved the final manuscript.

## REFERENCES

1. BJHU-EDU. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE). 2021; Johns Hopkins University (JHU).
2. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*. 2020;368(6493):860-868.
3. Blasi F, Gramegna A, Sotgiu G, Saderi L, Voza A, Aliberti S, et al. SARS-CoV-2 vaccines: A critical perspective through efficacy data and barriers to herd immunity. *Respir Med*. 2021:106355.
4. Lazarus JV, Ratzan S, Palayew A, Gostin LO, Larson HJ, Rabin K. Hesitant or Not. A Global Survey of Potential Acceptance of a COVID-19 Vaccine. 2020.
5. Mondejar-Lopez P, Quintana-Gallego E, Giron-Moreno RM, Cortell-Aznar I, de Valbuena-Maiz MR, Diab-Caceres L, et al. Impact of SARS-CoV-2 infection in patients with cystic fibrosis in Spain: Incidence and results of the national CF-COVID19-Spain survey. *Respir Med*. 2020;170:106062.
6. Corvol H, de Miranda S, Lemonnier L, Kemgang A, Reynaud Gaubert M, Chiron R, et al. First wave of COVID-19 in French patients with cystic fibrosis. *J Clin Med*. 2020;9(11):3624.
7. Agenas-Gov. Agenzia Nazionale per i Servizi Sanitari Regionali. 2021; Conference.
8. Ehde DM, Roberts MK, Herring TE, Alschuler KN. Willingness to obtain COVID-19 vaccination in adults with multiple sclerosis in the United States. *Mult Scler Relat Disord*. 2021;49:102788.
9. Dalal RS, McClure E, Marcus J, Winter RW, Hamilton MJ, Allegretti JR. COVID-19 vaccination intent and perceptions among patients with inflammatory bowel diseases. *Clin Gastroenterol Hepatol*. 2021.
10. WHO. Draft Landscape and Tracker of COVID-19 Candidate Vaccines. 2021.
11. Greinacher A, Thiele T, Warkentin TE, Weisser K, Kyrle PA, Eichinger S. Thrombotic Thrombocytopenia after ChAdOx1 nCov-19 Vaccination. *N Engl J Med*. 2021.