Impact of a personalized benefit risk assessment of acceptance for COVID-19 vaccine in a population of patients with chronic conditions: a therapeutic impact study

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Background

Studies have shown that 20 to 30% of people would not take a COVID-19 vaccine, with a similar figure among care professionals [1-4]. Following the announce of new vaccines for COVID-19, people, including researchers and clinicians have stated that they would not want to get the vaccine early because of the lack of data on potential harms, especially in specific populations such as patients with chronic conditions. Factors associated with COVID-19 vaccine hesitancy were related to participants' or vaccine characteristics (i.e., income, place of residence, political opinion, efficacy, harms, number of injections, origin of the vaccine (e.g., domestic vs. imported))[3, 5].

To our knowledge, there is no specific tool summarizing the available evidence, in order to help patients and their physicians take informed decisions regarding vaccination. Such tools have been shown to improve people's knowledge regarding options, reduce their decisional conflict related to feeling uninformed and unclear about their personal values[6]. Especially, structured assessments, personalized to patients' context, may better influence patients' decisions [7].

Objective

To determine if the presentation of a personalized structured assessment of the benefits and harms of such vaccination would improve the intent to undergo COVID-19 vaccination for patients with chronic conditions.

Methods

Therapeutic impact study in patients with chronic conditions. The study will compare patients' intent to undergo vaccination before and after being presented a personalized structured assessment of the benefits and harms of COVID-19 vaccination. Patients will assess their intent to undergo vaccination with the different vaccines that will be available in Europe and using (or not) mRNA technology.

Study Participants and setting

Inclusion criteria

All participants from Compare (i.e., adult patients reporting at least one chronic condition) will be invited to participate in the trial.

Exclusion criteria

We will exclude patients who had had a confirmed COVID-19 infection (self-reported) as this may change their intent to undergo COVID-19 vaccination.

Setting

The trial will be nested in ComPaRe (Community of Patients for Research), an ongoing citizen science project based on an e-cohort of patients with chronic conditions (www.compare.aphp.fr)[8]. Participants in ComPaRe volunteer to accelerate research on chronic conditions. All participants provide electronic consent before participating in the e-cohort. ComPaRe was approved by the Institutional Review Board of Hôtel-Dieu Hospital, Paris (IRB: 0008367).

Intervention

Our aim was to develop an easy to use tool that provides structured assessment of the benefits and harms of COVID-19 vaccination. The tool is intended for patients and clinicians to make a risk informed decision on whether the patient should take the COVID-19 vaccine. Development will be informed by the IPDAS quality criteria [9]

The structured assessments will be drafted based on the existing scientific evidence available at the time of the design of the intervention: the ChAdOx1 nCoV-19 vaccine (Astra Zeneca)[10], the BNT162b2 mRNA vaccine (Pfizer)[11], and the mRNA-1273 vaccine (Moderna) [12].

The structured assessment tools will emphasize the following points:

- Short term benefits. Short term benefits emphasized the reduction in the risk of a severe COVID-19. We chose to use a simple age related risk because no existing tool suited our needs [13]. Indeed, a living review of prediction models for prognosis showed that all models were either developed on inpatients or used biological variables unavailable in this study [14]. Among models not included in the living review yet, suited our needs but involved some variables (e.g., the Townsend deprivation score and ethnicity) not available in France and in ComPaRe[15]. Therefore, we used values from Salje et al. (Science, 2020) reporting the burden of SARS-COV2 in France [13].
- Long term benefits. Long term benefits emphasized the reduction in the risk for long term consequences of COVID-19. Based on the literature, from 10-15% of patients continue having symptoms such as fatigue or cough on the long term [16, 17]. We used the tables reported in the paper of Sudre et al. (medRxiv, 2020) as they were the only to provide risks by age and sex [17].
- Benefits for others. We emphasized that vaccination would reduce the number of contagious people and therefore limit the risk to transmit COVID-19 to close relatives.
- Short term risks. Based on the data extracted from the preliminary results from vaccine trials. We focused on serious adverse events related to vaccine.
- Long term risks. As of today, the long term risks of COVID-19 vaccination are unknown, but likely to be rare.

Based on these information, we drafted several visual decision aids, inspired from existing tools [7]. The preliminary tool will be refined during cycles of pilot testing with participants from the ComPaRe e-cohort an general practitioners using a methodology described in the literature [18].

Below are the values used and references used in the tool.

Efficacy / safety	Value	Source
ChAdOx1 nCoV-19 vaccine	70.4% efficacy in reducing symptomatic COVID-19 more than 14 days after the second dose of vaccine	Preliminary vaccine report[10]
BNT162b2 mRNA vaccine	95% efficacy in preventing Covid-19 occurrence at least 7 days after the second dose in participants without evidence of infection	Primary vaccine report[11]
mRNA-1273 SARS-CoV-2	94.1% efficacy in reducing symptomatic COVID-19 more than 14 days after the second dose of vaccine	Primary vaccine report[12]
Safety short term		
ChAdOx1 nCoV-19 vaccine	2/12 021 patients had events potentially related to the vaccine (a case of transverse myelitis, fever higher than 40°C)	Preliminary vaccine report[10]
BNT162b2 mRNA vaccine	4/18 860 patients had serious adverse events potentially related to the vaccine (shoulder injury related to vaccine administration, right axillary lymphadenopathy, paroxysmal ventricular arrhythmia, and right leg paresthesia)	Primary vaccine report[11]

mRNA-1273 SARS-CoV-2	71 participants [0.5%] of patients in the vaccine arm reported a treatment related serious adverse event.	Primary vaccine report[12]

Data collection

Demographic and clinical characteristics of patients (i.e., age, sex, educational level, comorbidities, number of people living with the participant) are collected as part of the ComPaRe baseline data collection.

In addition to study outcomes we will assess:

- Whether participants live with people aged > 65 years old (Yes/No)
- For those who answer negatively, whether participants visit frequently (≥ 1/week) people aged > 65 years old (Yes/No)
- Whether participants live with people having chronic conditions (Yes/No)
- For those who answer negatively, whether participants visit frequently (≥ 1/week) people having chronic conditions(Yes/No)
- Reasons why they would accept or refuse to take the COVID-19 vaccine, collected using free text.

Study outcomes

The primary outcome will be

- The difference in the proportion of participants intending to undergo COVID-19 vaccination (Yes/No question) before and after presentation of the decision aid.

Secondary outcomes will be:

- The mean difference in participants' perception in the importance for them to get COVID-19 vaccination (using a numeric scale ranging from 0 to 100) before and after presentation of the decision aid.
- The mean difference in participants' perception in the importance for the population to get COVID-19 vaccination (using a numeric scale ranging from 0 to 100) before and after presentation of the decision aid.

Statistical Analysis

Characteristics of participants will be described by their mean (standard deviation) for continuous values and number (%) for categorical values. We will compare the outcomes before and after presentation of the structured assessments using Chi^2 test for proportions and Student's test for continuous values.

Open text answers will be analyzed

Sample size

Sample size will be based on results from studies assessing how structured assessments can influence decisions from patients.

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