

Behavioural changes associated to the COVID-19 vaccine: Evidence from a cross-national Facebook survey

Keywords: COVID-19; Vaccines; Human behaviours; Facebook surveys; Multivariate analysis

Extended Abstract

At the beginning of 2021, vaccination campaigns for COVID-19 were rolled out in many countries, providing a pharmaceutical measure to protect against the most severe symptoms and to contrast the spreading of the virus. Nonetheless, due to the initial limited supply and unprecedented logistic challenges, non-pharmaceutical interventions (NPIs) such as face masks and social distancing remained essential to sustain the incredible efforts of mass immunisation campaigns and to reach adequate vaccination coverage [1]. In this delicate context, some might have seen their own vaccination as the official end of the emergency and, as a result, they may have relaxed their COVID-safe behaviours, facilitating the spreading of the virus. From a modelling standpoint, previous studies have focused on the interplay between NPIs adoption, COVID-19 spread, and vaccination campaigns [2], but empirical evidence to support and quantify their link is still limited. For this reason, we conducted a data collection with a double aim: understand which NPIs were relaxed by the population after which stage of the vaccination campaign, and investigate how this relaxation of behaviours was associated with respondents' demographic characteristics.

In order to do so, we developed an original cross-national online survey named “COVID-19 Prevention and Behavior Survey”, collecting a total of 2263 filled questionnaires. Respondents were recruited using targeted ads on Facebook in 4 different countries, that we selected based on different characteristics in the vaccination coverage, disease prevalence, and dominant SARS-CoV-2 strain: Italy, the United Kingdom, South Africa and Brazil [3, 4]. We conducted our survey study between the 26th of November and the 22nd of December 2021, when the Omicron variant started to spread worldwide. In the first part of the survey, we collected socio-demographic features, such as sex and age, while in the second part we focused on understanding to which extent individuals changed behaviours in response to the COVID-19 vaccine rollout and, if they did, which behaviours were relaxed. We included three different pivotal stages of the vaccination campaign that may have acted as trigger for the behaviour change of individuals, namely: the vaccination of those at higher risk of severe symptoms following COVID-19 infection (65+ and people with co-morbidities), the inoculation of the first dose, and the inoculation of the second dose. For each of these stages of the vaccination campaign we asked respondents about six different activities we chose as representatives of the main NPIs that were widely implemented to contrast the spread of SARS-CoV-2 before the arrival of vaccines.

Results show that in all 4 countries the activities that were changed the most are the social activities such going to a restaurant or a cinema and visiting relatives and friends. This is in good agreement with psychological models of behavioural changes such as the Health Belief Model (HBM) which states that activities with higher costs and perceived barriers (such as

the social activities) are the first ones to be relaxed. Furthermore, Figure 1 shows that the relaxation rate increases with the progression of the vaccination campaign and it is possible to observe some gender-specific and age-specific patterns: women and adults in general are less likely to relax their COVID-19 safe behaviours after the vaccine than men and young adults.

To understand which respondents' features were associated with the relaxation of social activities, we performed a multivariate analysis using a fixed effect model with a logistic regression and a binary outcome of: 1 - if at least one social activity was changed, 0 - otherwise. Logistic regression offers a great interpretability of the results and odds ratio can be easily computed from the coefficients. The results for each stage of the vaccination campaign are shown in Figure 2. It can be seen, that two of the most important determinants for the drop of social NPIs are: having tested positive for Covid-19 and having people at risk in the household (e.g. a person with a respiratory chronic disease). Indeed, they are positively associated with a change in social behaviours after the vaccination of people over 65 or with co-morbidities and after the second dose.

This work shows that particular caution has to be taken during vaccination campaign, because people might relax their COVID-19 safe behaviours regardless the dynamics of the epidemics. For this reason, it is extremely important to monitor the will of the population to comply with NPIs during and after their vaccination, in particular in those countries where the immunisation of the population is proceeding slowly. Ultimately, the results obtained can be used to inform behavioural compartmental models that simulate the spread of the virus in a scenario with a vaccination campaign.

References

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	Italy	South Africa	United Kingdom	Brazil	Total
Sex					
Female	261 (62.1%)	670 (67.7%)	195 (53.0%)	226 (78.2%)	1352 (65.4%)
Male	159 (37.9%)	320 (32.3%)	173 (47.0%)	63 (21.8%)	715 (34.6%)
Age					
18-24	42 (10.0%)	27 (2.7%)	19 (5.2%)	49 (17.0%)	137 (6.6%)
25-44	94 (22.4%)	132 (13.3%)	70 (19.0%)	48 (16.6%)	344 (16.6%)
45-64	165 (39.3%)	438 (44.2%)	154 (41.8%)	119 (41.2%)	876 (42.4%)
65+	119 (28.3%)	393 (39.7%)	125 (34.0%)	73 (25.3%)	710 (34.3%)
Household Size					
1	111 (26.4%)	150 (15.2%)	79 (21.5%)	52 (18.0%)	392 (19.0%)
2	117 (27.9%)	375 (37.9%)	160 (43.5%)	72 (24.9%)	724 (35.0%)
3-4	128 (30.5%)	303 (30.6%)	98 (26.6%)	100 (34.6%)	629 (30.4%)
5+	28 (6.7%)	135 (13.6%)	26 (7.1%)	47 (16.3%)	236 (11.4%)
No answer	36 (8.6%)	27 (2.7%)	5 (1.4%)	18 (6.2%)	86 (4.2%)
Education					
Primary school	8 (1.9%)	1 (0.1%)	4 (1.1%)	12 (4.2%)	25 (1.2%)
Secondary school	241 (57.4%)	447 (45.2%)	177 (48.1%)	179 (61.9%)	1044 (50.5%)
University-level	159 (37.9%)	474 (47.9%)	165 (44.8%)	79 (27.3%)	877 (42.4%)
Other	1 (0.2%)	29 (2.9%)	4 (1.1%)	2 (0.7%)	36 (1.7%)
No answer	11 (2.6%)	39 (3.9%)	18 (4.9%)	17 (5.9%)	85 (4.1%)

Table 1: Number of respondents by sex, age group, household size and education for each surveyed country. Unweighted sample.

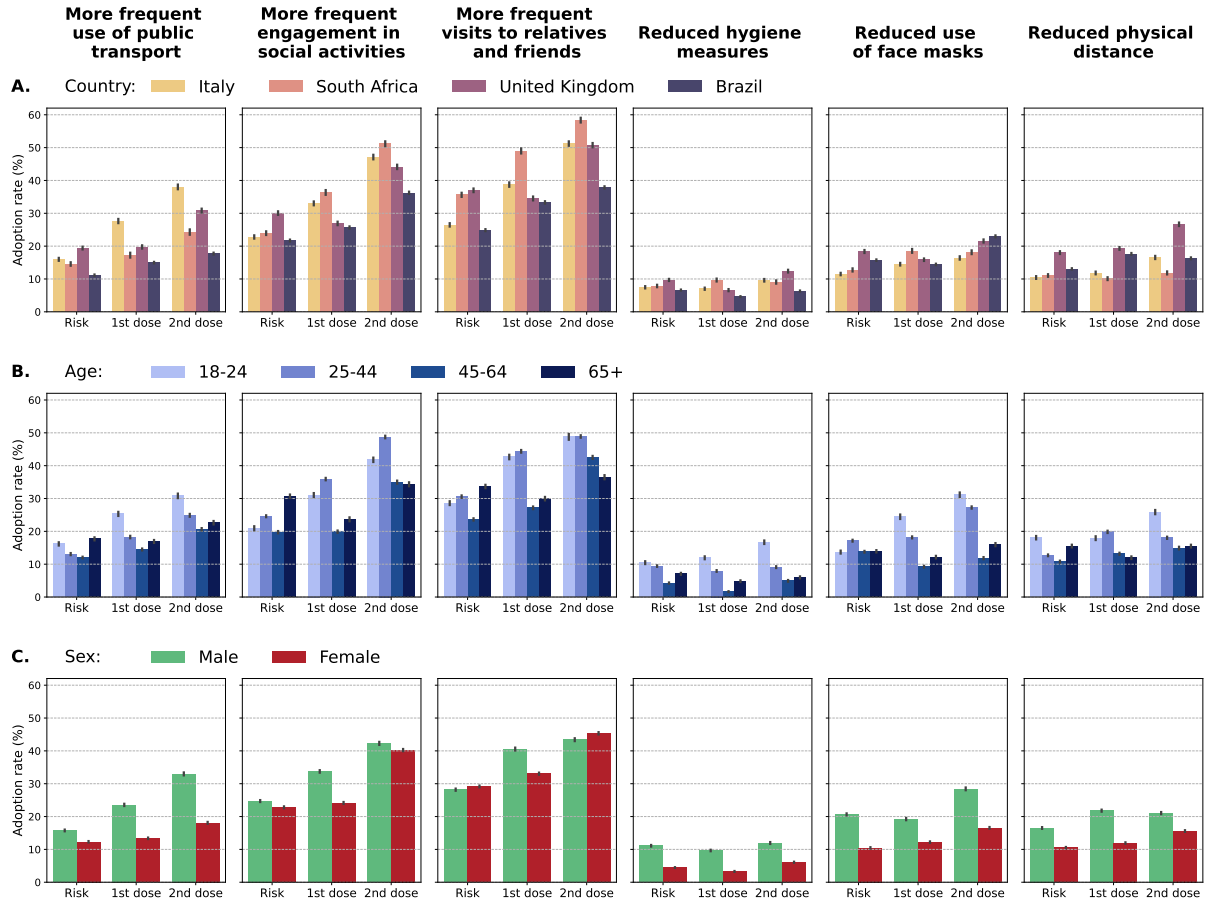


Figure 1: Adoption rate of behaviours for each phase of the vaccination campaign divided by country (A), age group (B) and sex (C). The three events considered are: after the vaccination of people over 65 years old or with co-morbidities (Risk), after the first dose (1st dose) and after the second dose (2nd dose). Bar plots show mean values and 95%CI as error bars.

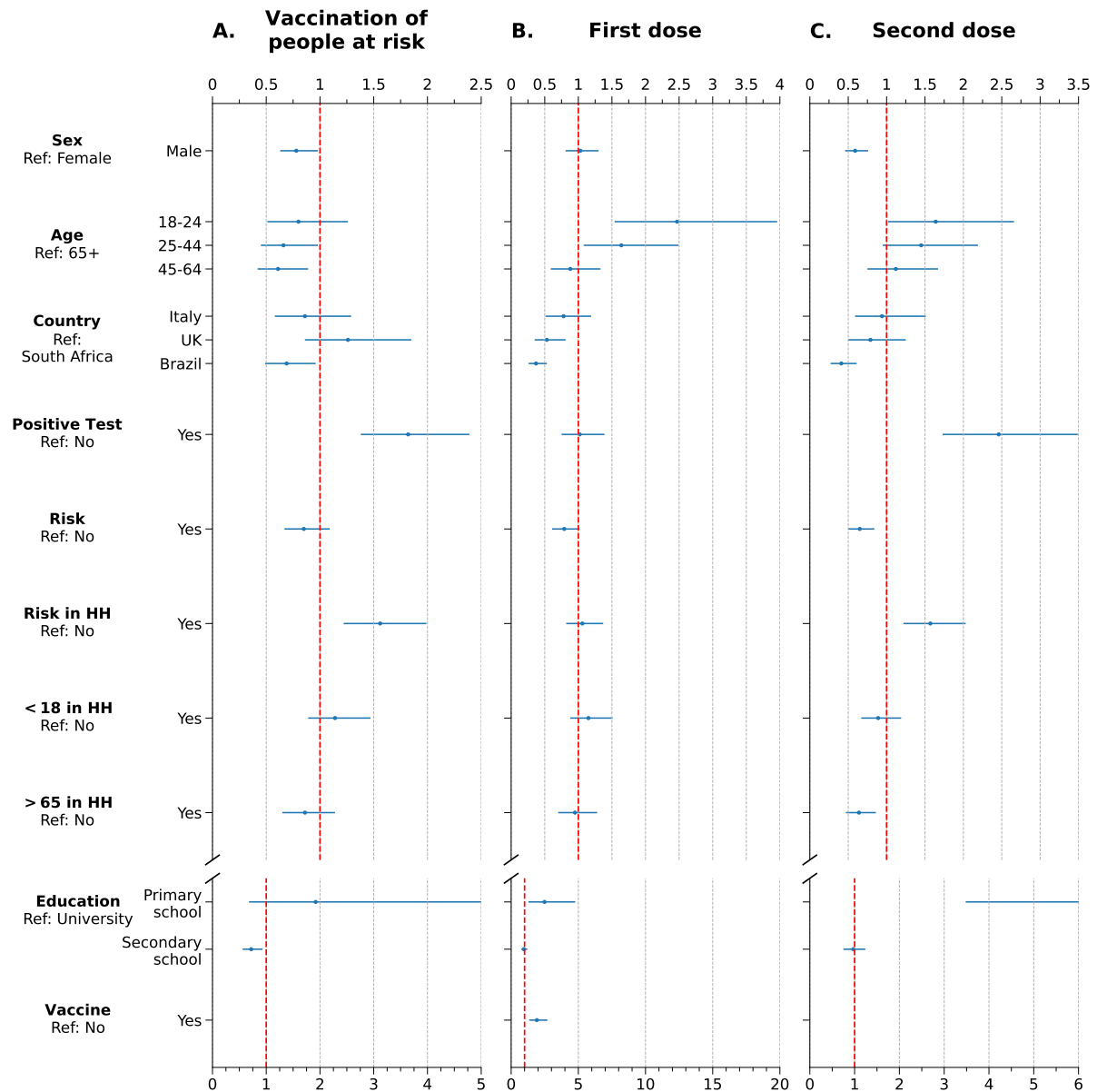


Figure 2: Odds ratio obtained from multivariate analysis of the survey responses related to behavioural changes after the vaccination of people over 65 years old or with co-morbidities (A), after the first dose (B), and after the second dose (C). The outcome considered is: 1 if there was a change in at least one of the two social activities, 0 otherwise.