



A Brief Report Monitoring the Different Emotional States Associated with the First and the Fourth Dose of the Anti-SARS-Cov-2 Vaccine in an Italian Sample of Fragile Patients Aged Over 60 Years

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ABSTRACT

Since the beginning of the COVID-19 pandemic, many researchers have been interested in studying attitudes and behaviors in relation to vaccination, highlighting, through data, the so-called “vaccination hesitancy” (VH) phenomenon. Our aim was to investigate emotional states associated with the fourth dose of the anti-COVID-19 vaccine in individuals from the over 60-year-old and fragile patient category and to compare them with data that were previously recorded when the first vaccine doses were administered. The online questionnaire was created ad hoc and includes different sections: socio-personal data and the State-Trait Anxiety Inventory (STAI-Y) were used to detect the level of the state of anxiety, understood as a feeling of insecurity and helplessness in the face of perceived damage that can lead to worry or to flight and avoidance. The total sample consisted of 57 participants (61.4% M; mean age 67.23; SD= 6.73). Differences in emotional states in relation to vaccination emerged between Group I and Group IV in which the former were more worried and indecisive, while the latter, although nervous, felt more comfortable. Overall, trust in science appears to be a key determinant of vaccination intention. Additional strategies promoting healthy behavior are needed.

Keywords: Anti-SARS-CoV-2 vaccine , booster dose (IV), patients aged over 60 years, emotional states

Since the beginning of the COVID-19 pandemic, many researchers [1,2] have been interested in studying attitudes and behaviors in relation to vaccination, highlighting, through data, the so-called “vaccination hesitancy” (VH) phenomenon. This phenomenon is circumscribed in a multiplicity of variables that are not only personological but also psychological, socio-cultural, and political.

A study was conducted among Chinese people to assess the psychological experience of basic COVID-19 vaccination, the willingness to receive booster vaccines, and to determine relationships between these factors [3]. The researchers classified psychological experiences associated with COVID-19 vaccination into positive and negative: for the former, the willingness to receive booster vaccines for participants was higher than that of participants who had negative psychological experiences with the vaccine.

Ben-David et al. [4] tested, for the first time, the role of a sense of control (SOC) due to vaccinations, trust, and VH and its association with compliance with getting the COVID-19 booster vaccine among older adults from Israel. Increased trust was only related to the difference between early vaccination and vaccine rejection.

Madison et al. [5] applied an integrated model to examine the effects of beliefs from multiple social cognition theories alongside sets of generalized, stable beliefs on individuals' booster vaccine intentions. US residents recruited from an online survey panel completed questions on measures of social cognition constructs (attitude, subjective norms, perceived behavioral control, and risk perceptions), generalized beliefs (vaccine hesitancy, political orientation, and free will beliefs), and COVID-19 vaccine intentions. Social cognition constructs were found to be related to booster vaccine intentions, with attitude and subjective norms exhibiting the largest effects. Effects of vaccine hesitancy, political orientation, and free will beliefs on

intentions were mediated by the social cognition constructs, and only vaccine hesitancy had a small residual effect on intentions.

In Germany, Sprengholz et al. [6] studied the key determinants of primary and booster vaccination that need to be understood and the potential effects of vaccination policies that must be examined. Compared to unvaccinated participants, those that underwent primary vaccination were less complacent, more often understood the collective protection afforded by vaccination, and less often endorsed conspiracy-based misinformation. Compared to participants that underwent primary vaccination, boosted individuals were even less complacent, exhibited fewer conspiracy-based beliefs, perceived fewer constraints by prioritizing vaccination over other things, and more often favored compliance with official vaccination recommendations. Support for and reactance to vaccination mandates depended on vaccination status rather than policy characteristics, regardless of the mandate type or incentives offered (up to 500 euros). While unvaccinated individuals rejected policy provisions and declined vaccination, boosted individuals indicated mid-level support for mandates and showed high vaccination intentions.

In Italy, Barattucci et al. [7] studied the health belief model (HBM), the theory of planned behavior (TPB), and different socio-demographic factors. Furthermore, they considered the possible mechanism associated with the impacts of distrust in science on individuals' hesitancy and resistance to undergoing SARS-CoV-2 booster vaccination in subjects living in Italy. The principal results showed (i) a positive relationship provided by HBM theory between perceptions of SARS-CoV-2 risk (vulnerability and severity) and intention to have the vaccine through fear of COVID-19; (ii) a positive relationship between subjective norms and trust in science and vaccination intention; and (iii) that trust in science plays a crucial role in predicting vaccination intention. Finally, the results provided indications about a positive relationship between subjective norms and fear of COVID-19 and demonstrated a full mediation role of trust in science in the relationships among determinants of both TPA and HBM, fear of COVID-19, and vaccination intention.

In our previous study [8], we investigated various determinants, including health perceptions, mistrust, anxiety, fears, and indecision, highlighting how they were influenced by some variables, such as the type of vaccine administered, age, and whether respondents had a professional role involving the care and safety of other people.

Furthermore, in another study [9], we highlighted the emotions and moods associated with adherence to a vaccination campaign, noting that multiple shades of negative emotions, such as fear, indecision, and anxiety, were present in ministerial categories of individuals who had already undergone administration during the first vaccination phase. The study, which included 83 participants (mean age = 22.23; SD = 4.3), showed that the 'benefits' outweighed the 'risks' associated with COVID-19 vaccines for young people under the age of 30 years, who were naturally predisposed to proactivity and resilience, overcoming so-called 'emotional reasoning'.

As of 11 July 2022, the Italian Ministry of Health, following the EMA guidance on COVID-19 vaccination, recommends the administration of a second booster dose, known as the 'fourth dose', for people over 60 years of age and individuals in "fragile" patient groups.

The administration of a second booster dose is crucial for the protection of the most fragile patients, who are more exposed to the risk of severe COVID-19 disease.

The purpose of this brief report, therefore, in accordance with data that have emerged from studies in the scientific literature, was a) to investigate the emotional states associated with the fourth dose of the anti-COVID-19 vaccine in the over 60-year-old and fragile patient category, and b) to compare the responses with data that were processed and recorded when the first doses of vaccines were administered in order to monitor the evolution or involution of the perception of VH.

The survey was conducted at the Vaccination Center of the ASL Salerno (Italy) after administration of the vaccine and during the observation phase in the post-vaccination room in accordance with the vaccination protocols (from 15 to 30 min depending on the risk of adverse reactions due to diseases or allergies). Participants were shown a QR-code that directly addressed the questionnaire entered on the Google Forms platform or, alternatively, a hard copy was provided. Completion of the questionnaire took approximately 10 min. The data were collected in January–March 2021 (first dose) and June–September 2022 (fourth dose).

The online questionnaire was created ad hoc according to the CHERRIES statement and divided into three sections: (1) the purpose of the survey, informed consent, and authorization to process personal data, specifying their use in anonymous and aggregate form; (2) socio-personal data; and (3) the State-Trait Anxiety Inventory (STAI-Y) [10] to detect the level of the state of anxiety, understood as a feeling of insecurity and helplessness in the face of perceived damage that can lead to worry or to flight and avoidance. Specifically, it is a self-assessment questionnaire in which the subject assesses, on a four-point Likert scale (from 1 = not at all to 4 = very much), how well the different statements fit their behavior. The internal consistency ranges from 0.91 to 0.95 for the state scale and from 0.85 to 0.90 for the trait scale.

Fifty-seven participants completed the questionnaire. The sample inclusion criteria were a) aged over 60 years and b) belonging to the 'fragile' patient category. According to the Anti-COVID-19 Vaccine Report of the Italian Ministry of Health (update 29/10/2022), only 12.99% of the population aged 60-69 years were administered the fourth dose. The Campania Region's Anti-COVID-19 Vaccines Report (updated on 28/10/2022) showed that only 1618 fourth doses were administered, of which 16.83% were in the area of Salerno and province (ASL Salerno), where our sample of participants was located in terms of their territorial health competence.

The total sample included in this study consisted of 61.4% males and had an average age of 67.23 (SD= 6.73). With regard to the participants' 'occupations', 45.6% were retired, 15.8% were employed, and the remainder fell into categories such as unemployed, housewives, self-employed, and traders. The sample was divided into two groups according to the dose of vaccine received: Group-I (n° 29 first dose) and Group-IV (n° 28 fourth dose).

IBM SPSS Statistics 23.0 software was used for the statistical analysis. Data conforming to the normal distribution in descriptive statistics are presented as the mean (M) $\pm$ standard deviation (SD). A comparison was made between the means of standardized scores obtained in the STAI-Y test.

The total sample showed a mean STAI-Y test score of 33.86 (SD= 8.40), and with regard to clinical levels of anxiety, 78.9% of participants were in the normal range, while 14% showed a mild level of anxiety and 7% showed a moderate level of anxiety. Differences in the STAI-Y total score between the two reference groups were found: Group-I showed a mean of 33.62 (SD= 9.34), while Group IV showed a mean of 34.11 (SD= 7.48). With regard to the variable 'sex', it emerged that, in general, females had higher average total scores than males: 35.77 (SD= 7.46) and 32.66 (SD= 8.83), respectively. We also analyzed the means obtained for the individual items of the STAI-Y in order to better illustrate the differences in the answers obtained from the two groups. The analysis showed that Group I had higher mean scores for being under pressure (1.41 ± 0.62), upset (1.41 ± 0.56), worried about future misfortunes (1.79 ± 0.72), intimidated (1.48 ± 0.68), nervous (1.57 ± 0.63), undecided (1.41 ± 0.50), content (2.14 ± 0.74), and confused (1.52 ± 0.91).

Group IV, on the other hand, showed average scores for the items related to feeling calm (1.86 ± 0.59), secure (1.78 ± 0.42), tense (1.54 ± 0.69), calm (2.07 ± 0.76), satisfied (1.86 ± 0.52), at ease (1.86 ± 0.70), self-confident (2.11 ± 0.62), agitated (1.50 ± 0.74), re-assured (2.04 ± 0.69), worried (1.64 ± 0.82), relaxed (2.25 ± 0.88), and good (2.04 ± 0.50).

The analysis of the results of this brief report reveals what has already been expressed in the literature. For example, a study by Gallè et al. [11] on vaccination acceptance and knowledge during the first phase of the COVID-19 vaccination campaign confirmed that knowledge and acceptance are closely correlated, emphasizing the role of providing correct information in combating vaccination hesitancy.

In this study, we wanted to highlight possible changes in attitudes and emotional states with reference to a specific period of the vaccination campaign. In fact, as the data showed, the subjects in Group I, i.e., those who were interviewed during the administration of the first anti-COVID-19 vaccine, were more concerned about the future and showed greater indecisiveness, nervousness, general worry, and feeling of being under pressure. In fact, in our previous studies [8, 9], we pointed out that the emotions and moods related to adherence to a vaccination campaign are characterized by multiple shades of negative emotions, such as fear, indecision, and anxiety, during the first vaccination phase. On the other hand, subjects who also received the fourth dose showed not only feelings of tension but also states of calm, satisfaction, reassurance, and a general feeling of well-being. We think that these emotional states were had because the epidemiological situation is now calm and it is not emergency as during the first phase of Covid-19 vaccination campaign and this subjects have chosen of their own free will to get vaccinated because they are convinced that it can be a lifesaver given their fragility. Surely their conviction was supported by the information received from doctors who treat them.

A study in the UK suggested that personal benefit outweighs collective benefit in reducing vaccine hesitancy in about 10% of individuals classified as strongly hesitant [12]. In this group, providing written information about the personal benefits of vaccination increased their willingness to be vaccinated more than information about the collective benefits of vaccination did.

The study highlights the importance of understanding the nuances of messaging and providing different information to different groups to determine the best way to communicate the benefits of COVID-19 vaccination.

The effectiveness of the COVID-19 vaccination program depends on mass participation: the greater the number of people vaccinated, the lower the risk to the population.

In conclusion, mitigation of the COVID-19 pandemic requires continued uptake of SARS-CoV-2 vaccines. To increase vaccination intention and uptake, key determinants of primary and booster vaccination need to be understood and the potential effects of vaccination policies must be examined [6]. An individual's intention to get vaccinated requires the consideration of a plethora of socio-psychological factors. However, overall, trust in science appears to be a key determinant of vaccination intention. Additional strategies to promote healthy behaviors are needed [7].

Financial incentives could be an alternative to promote booster uptake [6].

The limitations of this brief report include the sample size. The inclusion of only subjects over 60 years of age and in the category of 'fragile' patients was done to monitor the flow of emotional states and vaccine acceptance with reference to a sample that had already been recruited and analyzed in order to better define, in the long term, the importance of studying these psychological and behavioral aspects for the definition of enhanced strategies.

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