Factors associated with current posttraumatic stress disorder among COVID-19 vaccinated older adults in Israel

Yuval Palgi, Lee Greenblatt-Kimron, Yaakov Hoffman, Robin Goodwin, Menachem Ben-Ezra

PII: S0022-3956(21)00504-5
DOI: https://doi.org/10.1016/j.jpsychires.2021.08.005
Reference: PIAT 4653

To appear in: Journal of Psychiatric Research

Received Date: 28 March 2021
Revised Date: 31 July 2021
Accepted Date: 9 August 2021

Please cite this article as: Palgi Y, Greenblatt-Kimron L, Hoffman Y, Goodwin R, Ben-Ezra M, Factors associated with current posttraumatic stress disorder among COVID-19 vaccinated older adults in Israel, Journal of Psychiatric Research (2021), doi: https://doi.org/10.1016/j.jpsychires.2021.08.005.

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

© 2021 Published by Elsevier Ltd.
Factors associated with Current Posttraumatic Stress Disorder Among COVID-19 Vaccinated Older Adults in Israel

Yuval Palgi¹, Lee Greenblatt-Kimron², Yaakov Hoffman³, Robin Goodwin⁴, & Menachem Ben-Ezra²

¹ Department of Gerontology, University of Haifa, Haifa, Israel
² School of Social Work, Ariel University, Ariel 40700, Israel
³ Interdisciplinary department, Bar-Ilan university, Ramat-Gan, Israel
⁴ Department of Psychology, Warwick University, Coventry, UK

Corresponding author:
Yuval Palgi, Ph.D. Department of Gerontology and the Center for Research and Study of Aging, University of Haifa, Mount Carmel, 3498838, Israel. Tel: 972-546685805.
E-mail address: ypalgi@research.haifa.ac.il. ORCID ID: 0000-0002-8675-5513
Abstract:

This is the first study to examine COVID-19 vaccine-related stressors in the context of current posttraumatic stress disorder (PTSD) symptoms amongst older adults exposed to traumatic events prior to the COVID-19 outbreak, with particular focus on the associations between ageism, vaccine-related stressors and PTSD. Five hundred and sixty-three participants aged 65 and above reported exposure to at least one traumatic event, their current PTSD level, physical and mental health, ageist attitudes, and vaccine related stressors. Univariate logistic regression revealed that depressive symptoms, ageism, vaccine hesitancy and severity of side effects were the main factors associated with clinical levels of current PTSD. These results suggest that older adults were vulnerable to intensified PTSD symptoms, not only as a result of greater depression, but also as a consequence of other factors, including ageism, vaccination hesitancy and vaccination side effects. Practitioners would benefit from awareness to these factors.
Factors associated with Current Posttraumatic Stress Disorder Among COVID-19 Vaccinated Older Adults in Israel

1. Introduction

Older adults have been greatly influenced by the deleterious consequences of the COVID-19 pandemic, which has resulted in a deterioration of mental health (Shrira et al., 2020, Zhu et al, 2021). However, in line with the literature on posttraumatic stress disorder (PTSD), during both the SARS-CoV-1 and COVID-19 (SARS-CoV-2) pandemics, older adults were more resilient, and experienced a lesser mental health burden than younger adults (Sterina et al., 2021). This is despite evidence that those with previous pre-pandemic exposure to trauma were more susceptible to current posttraumatic stress symptoms (Solomon et al., 2021), and those at greater risk of infection by COVID-19 report higher levels of posttraumatic symptoms (Jiang et al., 2020; Sun et al., 2020). The current study examines whether vaccination in this context is perceived as a ‘possible’ light at the end of the pandemic tunnel or as a potent stressor. The novelty and speedy development of the new COVID-19 Pfizer vaccine contributed to a great deal of misinformation and the spread of conspiratorial fears (Donovan, 2020; Fusick et al., 2020). Vaccine concerns were particularly prominent in Israel during the initial vaccination stage, as Israel was the first country to roll out a nationwide vaccination program (Ministry of Health, Israel, 2021). As in other countries, one concern was that “vaccination is more dangerous than COVID-19” (Berry, et al., 2021). Therefore, it was expected that vaccination may also be a stressor due to its novelty and rumored risks, which we predict will be positively associated with PTSD symptoms. We
present the first study to address the association between potential vaccine-related stressors and current PTSD symptoms amongst older adults vaccinated for COVID-19.

While some have treated PTSD symptoms as an independent variable during COVID-19 (Maytles, et al., 2021), in our study PTSD was treated as an outcome for two reasons. First, although trauma exposure may have likely preceded COVID-19, our assessment of PTSD frames this in the context of the last month. Second, and more importantly, previous longitudinal studies have shown that COVID-19 related experiences, e.g., news exposure (Solomon, et al., 2021), or COVID-19 exposure (Wathelet, et al., 2021), exacerbated prior PTSD symptoms. We thus anticipated that vaccine-related stressors (e.g., vaccine hesitancy, and post vaccination side-effect severity) may be associated with current PTSD, among participants with pre-COVID-19 trauma exposure. Another important factor we examined was ageism (e.g., negative stereotypes against older adults) as the COVID-19 pandemic was portrayed, as a “problem of older adults” (Ayalon et al., 2020, p. 1221). We, thus, examined the putative association of ageism with current PTSD status (see Levy et al., 2019). Finally, we examined the classical concomitants of PTSD (i.e., self-rated health, anxiety, and depressive symptoms).

2. Methods:

2.1. Sample and process

Using a web-based survey company, data were collected from January 25 to February 4, 2021 amongst the Jewish population across Israel using representative proportional sampling. On the last day of data collection 3,387,105 (36.42%) Israelis had received their
first vaccine dose, and more than two million citizens (21.77%; 58.8% of them 60+) received their second dose of vaccination (Ministry of Health, Israel, 2021). The survey included 563 participants (average age=68.91±3.38, range 65-85) who reported receiving at least one vaccination dose and reported exposure to at least one traumatic event prior to the COVID-19 pandemic. Respondents were predominately female ($n=339$, 60.2%), 73.2% were married/cohabitating ($n=412$), and 49.9% had tertiary-education ($n=281$).

2.2. Measures:

Participants indicated their age, gender, marital-status (1=not married, 2=married/living as cohabitant) and education (five levels: 1=elementary education to 5=academic education). Physical health was reported using a self-rated health item “In general, how do you rate your health?” on a scale ranging from 1 (not good at all) to 5 (very good) (Idler & Benyamini, 1997), mental health was measured both by the depressive symptoms 9-item PHQ-9 scale ($\alpha=.846$; Spitzer et al., 2006), and by the general anxiety 7-item scale (GAD-7, $\alpha=.948$; Kroenke et al., 2001). A 20-item questionnaire evaluated ageism ($\alpha=.869$, North & Fiske, 2013). Finally, three vaccination measures were: (1) number of days since first vaccine, (2) vaccine hesitancy (8 items adapted from Giambi et al., 2018, $\alpha=.832$), (3) 23-items indexing severity of COVID-19 vaccine side effects on a 5-point Likert scale (1=not at all to 5=very-severe; $\alpha=.830$, taken both from the FDA website (https://www.fda.gov/media/144414/download) and the Israeli Ministry of Health https://www.health.gov.il/English/Pages/ HomePage.aspx). PTSD symptoms were measured by the ITQ which included 6-items comprising three clusters: re-experiencing, avoidance, and a sense of threat (ITQ; Cloitre et al., 2018; $\alpha=.839$) experienced in the last month with reference to their pre-COVID-19 traumatic exposure. Clinical PTSD levels
were determined when each of the three symptom clusters caused a high/very high level of suffering and significant functional impairment. There was no multicollinearity; tolerance was 0.790; the variance inflation factor (VIF) was 1.226 (Field, 2009; O’Brien, 2007). Ethical approval was received from the Institutional Review Board at the university of the second and last authors.

3. Results:

In our sample 134 (23.8%) participants reached the clinical PTSD criteria levels. Participants with clinical PTSD levels were younger, suffered from more adverse health condition, showed more anxiety and depressive symptoms, had more negative age stereotypes, were vaccinated a few days later, showed higher vaccine hesitancy levels, and displayed more severe side effects (see Table 1).

A univariate logistic regression analysis showed that none of the demographic variables was significantly associated with PTSD. Depressive symptoms were associated with a higher risk for PTSD (PHQ-9: \( OR=1.09, 95\% CI: 1.03-1.15 \)); ageism was also related to a higher risk for PTSD (\( OR=1.50, 95\% CI: 1.08-2.08 \)). Finally, PTSD was linked both with higher levels of vaccine hesitancy (\( OR=1.49, 95\% CI: 1.06-2.10 \)) and severity of side effects (\( OR=2.39, 95\% CI: 1.06-5.39 \)).

4. Discussion

The current study assessed factors associated with current PTSD in vaccinated older adults who were exposed to a pre-COVID-19 traumatic event. Prevalence of clinical PTSD levels was high (23.8%). To contextualize this PTSD prevalence rate, note that a web-based young adult sample conducted three years ago by the same survey company revealed a
PTSD prevalence of 9.0% (Ben-Ezra et al., 2018). Moreover, such a high PTSD prevalence rate is similar to that obtained in midlife and older-adults civilians after two decades of missile attacks, where PTSD prevalence was estimated at 24.8% (Palgi, 2017). Thus, it is likely that both preceding COVID-19 conditions (death, sickness, etc.) along with the pioneering accelerated Israeli vaccination program may have served as stressors, especially for those exposed to past trauma. Additionally, elevated vaccine suspicion and mistrust of medical authorities, likely evidenced through vaccine hesitancy, were also linked with higher PTSD symptom levels. These findings emphasize the necessity for a comprehensive public awareness campaign focusing on vaccination safety and targeted at those with higher levels of vaccine hesitancy. Such a campaign may not only encourage vaccination willingness but may also reduce levels of PTSD.

While ageism has been previously associated with higher PTSD levels (Levy et al., 2019), it may have been that COVID-19 ageism (Ayalon, et al, 2021) would have been less relevant after vaccination, as older adults no longer compete with younger counterparts for necessary lifesaving resources. Our data suggests however that even after vaccination older adults reacted to the internalized ageist attitudes prevalent during COVID-19 (see Ayalon, 2020), with this vulnerability associated with their susceptibility to trauma. Likewise, experiencing more severe vaccination side effects potentially questioned vaccination safety, acting as a stressor that in turn was positively related to higher risk for PTSD. However, the cross-sectional nature of the current study did not allow us to discern directionality (whether anxieties related to vaccination safety exacerbated PTSD or vice-a-versa). Similarly, as we did not assess the type of pre-COVID-19 exposure or COVID-related stress, we cannot know if and how different exposures or stressors may have
impacted results. Furthermore, our study may have been biased by including only vaccinated older adults exposed to at least one traumatic event that occurred before the COVID-19 outbreak. Nevertheless, our findings show it is important for practitioners to pay attention to ageist attitudes, vaccine hesitancy, and severe vaccination side-effects in light of their association with PTSD symptoms amongst older adults.
References

Ayalon, L. 2020. There is nothing new under the sun: Ageism and intergenerational tension in the age of the COVID-19 outbreak. Int. Psychogeriatr., advanced online publication.
https://doi.org/10.1017/S1041610220000575

Ayalon, L., Chasteen, A., Diehl, M., Levy, B., Neupert, S.D., Rothermund, K., ... & Wahl, H.W. 2021. Aging in times of the COVID-19 pandemic: Avoiding ageism and fostering intergenerational solidarity. J. Gerontol. B. Psychol. Sci Soc. Sci.76, 47-52.
https://doi.org/10.1093/geronb/gbaa051

Ben-Ezra, M., Karatzias, T., Hyland, P., Brewin, C.R., Cloitre, M., Bisson, J.I., ... & Shevlin, M. 2018. Posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) as per ICD-11 proposals: A population study in Israel. Depress. Anxiety. 35, 264-274.
https://doi.org/10.1002/da.22723

Berry, S.D., Johnson, K.S., Myles, L., Herndon, L., Montoya, A., Fashaw, S., & Gifford, D. 2021. Lessons learned from frontline skilled nursing facility staff regarding COVID-19 vaccine hesitancy. J. Am Geriatr. Soc. https://doi.org/10.1111/jgs.17136

Cloitre, M., Garvert, D.W., Brewin, C.R., Bryant, R.A., Maercker, A. 2013. Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. Eur. J. Psychotraumatol. 4, 20706.

Donovan J. (2020). Social-media companies must flatten the curve of misinformation. Nature.
doi:10.1038/d41586-020-01107-z.

Fusick, A.J., Gunther, S., Sullivan, G. 2020. The anti-vaccination movement: when does a belief become delusional?. J. Public. Health. 1-2. https://doi.org/10.1007/s10389-020-01244-9
Giambi, C., Fabiani, M., D'Ancona, F., Ferrara, L., Fiacchini, D., Gallo, T., ... & Rota, M.C. 2018. Parental vaccine hesitancy in Italy—results from a national survey. Vaccine, 36, 779-87. https://doi.org/10.1016/j.vaccine.2017.12.074.

Field, A.P. 2009. Discovering statistics using SPSS. Sage, London.

Idler, E.L., & Benyamini, Y. 1997. Self-rated health and mortality: a review of twenty-seven community studies. J. Health. Soc. Behav. 38, 21-37. https://doi.org/10.2307/2955359

Jiang, H., Nan, J., Lv, Z., & Yang, J. 2020. Psychological impacts of the COVID-19 epidemic on Chinese people: Exposure, post-traumatic stress symptom, and emotion regulation. Asian. Pac. J. Trop. Med. Advance online publication. http://www.apjtm.org/preprintarticle.asp?id=281614

Kroenke, K., Spitzer, R.L., & Williams, J.B. 2001. The PHQ-9: Validity of a brief depression severity measure. J. Gen. Intern. Med. 16, 606-613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Levy, B.R., Chung, P.H., Slade, M.D., Van Ness, P.H., & Pietrzak, R.H. 2019. Active coping shields against negative aging self-stereotypes contributing to psychiatric conditions. Soc. Sci. Med. 228, 25-29. https://doi.org/10.1016/j.socscimed.2019.02.035

Maytles, R., Frenkel-Yosef, M., & Shrira, A. 2021. Psychological reactions of Holocaust survivors with low and high PTSD symptom levels during the COVID-19 pandemic. J. Affect. Disord. 282, 697-699. https://doi.org/10.1016/j.jad.2021.01.007

Ministry of Health 2021. COVID-19 in Israel. Retrieved from https://datadashboard.health.gov.il/COVID-19/general?utm_source=go.gov.il&utm_medium=referral on 7/3/21.
North, M.S. & Fiske, S.T. 2013. A prescriptive intergenerational-tension ageism scale: Succession, identity, and consumption (SIC). Psychol. Assess. 25, 706-713. https://doi.org/10.1037/a0032367

O’Brien, R.M. 2007. A caution regarding rules of thumb for variance inflation factors. Qual. Quant. 41, 673-690.

Palgi, Y. 2017. Matter of will: The association between posttraumatic stress symptoms and the will-to-live. Psychiatry. Res. 249, 180-186. https://doi.org/10.1016/j.psychres.2017.01.021

Shrira, A., Hoffman, Y., Bodner, E., & Palgi, Y. 2020. COVID-19 related loneliness and psychiatric symptoms among older adults: The buffering role of subjective age. Am. J. Geriatr. Psychiatry. 32, 1371–1375. https://doi.org/10.1016/j.jagp.2020.05.018

Solomon, Z., Ginzburg, K., Ohry, A., & Mikulincer, M. 2021. Overwhelmed by the news: A longitudinal study of prior trauma, posttraumatic stress disorder trajectories, and news watching during the COVID-19 pandemic. Soc. Sci. Med. 278, 113956.

Spitzer, R.L., Kroenke, K., Williams, J.B., & Löwe, B. A. 2006. Brief measure for assessing generalized anxiety disorder: The GAD-7. Arch. Intern. Med. 166, 1092-1097. doi:10.1001/archinte.166.10.1092

Sterina, E., Hermida, A.P., Gerberi, D.J., & Lapid, M.I. 2021. Emotional Resilience of Older Adults during COVID-19: A Systematic Review of Studies of Stress and Well-Being. Clin. Gerontol. 1-16. DOI: 10.1080/07317115.2021.1928355

Sun, L., Sun, Z., Wu, L., Zhu, Z., Zhang, F., Shang, Z., Jia, Y., Gu, J., Zhou, Y., Wang, Y., Liu, N., & Liu, W. (2020). Prevalence and risk factors of acute posttraumatic stress symptoms during the COVID-19 outbreak in Wuhan, China. MedRxiv. https://doi.org/10.1101/2020.03.06.20032425
Wathelet, M., Fovet, T., Jousset, A., Duhem, S., Habran, E., Horn, M., ... & D'Hondt, F. 2021. Prevalence of and factors associated with post-traumatic stress disorder among French university students 1 month after the COVID-19 lockdown. Transl. Psychiatry. 11, 1-7.

Zhu, K., Niu, Z., Freudenheim, J.L., Zhang, Z.F., Lei, L., Homish, G.G., ... & Mu, L. 2021. COVID-19 Related Symptoms of Anxiety, Depression, and PTSD among US Adults. Psychiatry. Res. 301, 113959
Table 1. Univariate Logistic Regression Analyses

| Variable                        | Difference Tests | Univariate Logistic Regressions, Likelihood of Diagnosis Relative to No Diagnosis |
|---------------------------------|------------------|----------------------------------------------------------------------------------|
|                                 | Not PTSD vs. PTSD Mean(SD)/ N(%) | Difference test                      | PTSD cutoff, (429 vs. 134) OR (95% CI) |
| Age                             | 69.13(3.44) vs. 68.22(3.10)     | \( t(561)=2.75** \) \( d=.27 \) | .936(.871-1.005) |
| Gender\(^a\)                    | 46 (8.2%) vs. 88 (15.6%)        | \( \chi^2 (1)=2.27; p=.13 \) | .970(.593-1.585) |
| Marital status\(^b\)            | 39 (6.9%) vs. 95 (16.8%)        | \( \chi^2 (1)=.49; p=.49 \) | .934(.554-1.574) |
| Education\(^c\)                 | 5.26 (.90) vs. 5.12(1.09)       | \( t(561)=1.49; p=.14; d=.15 \) | .901(.719-1.130) |
| Self-rated health\(^d\)         | 3.70 (.93) vs. 3.29 (.98)       | \( t(561)=4.42*** d=.44 \) | .863(.678-1.098) |
| GAD-7                           | 2.95 (4.77) vs. 5.75 (5.47)     | \( t(561)=-5.72*** d=.57 \) | 1.037(.991-1.085) |
| PHQ-9                           | 3.73 (3.97) vs. 6.94 (5.55)     | \( t(561)=-7.37*** d=.73 \) | 1.089(1.032-1.150)** |
| Ageism                          | 2.20 (.67) vs. 2.43 (.66)       | \( t(561)=-3.42** d=.34 \) | 1.500(1.081-2.084)* |
| Days since vaccination           | 28.56 (9.30) vs. 25.91 (10.13)  | \( t(561)=2.82** d=.28 \) | .986(.963-1.010) |
| Vaccine hesitancy                | 1.83 (.62) vs. 2.23 (.75)       | \( t(561)=-6.09*** d=.60 \) | 1.491(1.061-2.096)* |
| Severity of side effects         | 1.21(.24) vs. 1.36 (.31)        | \( t(561)=-5.85*** d=.58 \) | 2.386(1.057-5.386)* |

Note: Total N= 885; Nagelkerke R²=.22, Positive PTSD= 134, negative PTSD= 429. \(^a\)PTSD for 1= male, 2= female. \(^b\)PTSD for 1= not married, 2= currently married, or living with a partner. \(^c\)= five education levels from 1) preprimary education to 5) tertiary education. \(^d\)= not good at all to 5= very good.

\(^*\)p< .05, **p < .01, ***p < .001.
**Funding:** This study was supported by internal research grant from Ariel University, given to Menachem Ben-Ezra.

**Statement of interest:** The authors declare that they have no actual or potential conflict of interest of any kind in relation to this study.

**Acknowledgements:** we would like to thank to all those who helped us to distribute the questionnaire.