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Impact of societal resilience on vaccine hesitancy and uptake: Lessons learned from the Israeli experience

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\textbf{ABSTRACT}

\textbf{Background:} Vaccine hesitancy threatens COVID-19 pandemic management. Increasing vaccine uptake is important to containment of the virus, and achievement of herd immunity.

\textbf{Objective:} To identify factors of resilience, distress, and well-being that impact vaccine hesitancy and uptake.

\textbf{Method:} A cross-sectional study was conducted during the pandemic’s fourth wave. The data were collected by an internet panel company. A representative sample of Israeli residents (\(N=2002\)) answered an online questionnaire. A stratified sampling method was employed regarding geographic distribution, gender, and age. As vaccine hesitancy poses a threat to the effective management of the pandemic, the outcome measures included vaccine hesitancy and uptake (dependent variables), and resilience, distress, and well-being (independent variables).

\textbf{Results:} 24\% of respondents reported a high level of vaccine hesitancy; 68\% received 3 vaccines; 5\% did not receive any vaccine. Six predictors together explained 22\% of vaccine hesitancy and 15\% of vaccine uptake.

Path analysis indicated that: (a) Societal resilience was the best predictor of vaccine hesitancy and uptake: the higher the societal resilience, the lower vaccine hesitancy, and the higher vaccine uptake. (b) The higher sense of danger, the higher vaccine hesitancy, and the lower vaccine uptake. (c) The higher level of religiosity, the lower vaccine uptake. (d) The higher the family income, the lower level of vaccine hesitancy.

\textbf{Conclusions:} Findings suggest that public attitudes are primarily influenced by the degree of trust in the leadership and other components of societal resilience. Further research should investigate the impact of transparency concerning COVID-19 decision-making on vaccine hesitancy and uptake.

1. \textbf{Background}

Vaccinations are among the most important public health tools for reducing the spread of communicable diseases [1]. Nevertheless,
since the development of the COVID-19 vaccine and despite evidence that presents its high levels of efficacy and safety, a global trend of skepticism and resistance to being vaccinated is growing [2,3]. Vaccine hesitancy has become a great challenge to global health [4] and poses a threat to the general population. At the end of 2022, Israel was among the leading countries in booster vaccine coverage.

According to the Israeli Ministry of Health, over 4.5 million people have already received the third (booster) vaccine and over 830,000 individuals have even received four doses of the vaccine (https://datadashboard.health.gov.il/COVID-19/general). While compared to numerous other countries, the percentage of people vaccinated is high (over 50% of the population from 60 years of age onwards were fully vaccinated and over 90% were vaccinated at least once), it is important to understand the factors that impact on the population’s compliance with the recommendation to be vaccinated according to the medical authorities’ recommendations. The current study aimed to examine vaccine hesitancy and uptake, and their associations with indicators of resilience, distress, and well-being, among a large sample of the Israeli population.

2. COVID-19 vaccine hesitancy

Studies of vaccine hesitancy encompass diverse areas including (a) The scope of this widespread social phenomenon [3,5]. (b) The associations between vaccine hesitancy and various factors, such as trust [6], demographic and psychological characteristics [6,7], political attitudes [7,8], and level of income [9]; (c) Media coverage and its effect on the tendency to be vaccinated [10,11]; (d) The reasons stated by those who hesitate or refuse to be vaccinated [2].

3. COVID-19 vaccine uptake

Increasing vaccine uptake is considered one of the most important challenges. The hope for containment of the virus is believed to be possible only through high compliance levels of vaccine uptake, hopefully leading to herd immunity [12,13]. Varied strategies have been adopted to enhance the vaccine uptake, including monetary incentives, presenting leaders or celebrities being vaccinated, utilizing different risk communication campaigns, stressing cultural norms or beliefs, or issuing varied constraints and limitations on individuals that refrain from being vaccinated [14,15]. For example, a major strategy adopted in Israel directed at raising the motivation to be vaccinated is the ‘green pass’ that permits those that were vaccinated to enter cultural, sports, or social events, restaurants, and additional public places, while prohibiting entrance from those that do not possess this ‘green pass’ [16]. Other measures used in Israel in the effort to increase vaccine uptake included the creation of designated task forces for populations that were cautious of the vaccine, such as Arab and ultra-orthodox sectors [17], and risk communication campaigns that were often based on ‘fear tactics’ [18].

Varied ‘conspiracy theories’ disseminated among varied populations, resulted in increased vaccine hesitancy and subsequently, a substantial decrease in vaccine uptake [19]. Additional factors that may have contributed to vaccine hesitancy in Israel were the perceptions that human rights are disregarded, as some sectors (such as teachers and employees of local municipalities) were ‘coerced’ to be vaccinated [20], or that the medical providers do not as yet have sufficient knowledge concerning the long-term effects of the vaccine [21].

4. Indicators of coping with stress during COVID-19

Three types of indicators are commonly used to investigate ways of coping with stress [22], including resilience (societal and individual resilience), distress (anxiety, depressive symptoms, and sense of danger), and well-being (hope and morale).

Societal resilience (SR). This concept (formerly called national resilience) refers to the perceived ability of the society to successfully deal with adversities and quickly recover after the threat has been removed. Factor analysis showed that SR includes four factors: trust in leadership, trust in state institutions, social cohesion, and patriotism [23,24]. Above all, SR represents how individuals, such as state residents, trust their leadership, state, and society. This is especially noticeable in times of a national crisis or disaster.

Individual resilience. Individual resilience in face of adversity is the person’s ability to cope with the adversity and return to everyday function as soon as possible [25,26].

Distress symptoms. Distress symptoms are the most common human reactions in response to threats. Common reactions are symptoms of anxiety and depression [27]. Several researchers use the level of the individual’s distress symptoms as a measure of the individual’s resilience and/or coping level [28].

Sense of danger. Threats and disasters often evoke feelings of danger, mainly the individual’s perception that his/her life and/or family life are in danger [29]. These feelings, like symptoms of distress, are negative indicators of the individual’s coping capacity [30].

Hope. Hope is defined as “a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed energy) and (b) pathways (planning to meet goals) [31].”

Morale. Morale is defined as “a quality which involves feelings, emotions, attitudes, and perceptions toward the organization and its members [32].” Hope and morale have been used as indicators of positive coping capacities.

Considering the importance of identifying factors that impact vaccine hesitancy and uptake during the COVID-19 pandemic, the current study aimed to investigate these indicators of coping with stress. The data was collected during the fourth wave of the pandemic in Israel when the vaccination campaign for a third inoculation (a “booster”) was in place.

Based on former studies examining associations of vaccine hesitancy with various variables, we have made the following hypotheses:

(a) Vaccine hesitancy and vaccine uptake will be significantly and negatively correlated: The higher vaccine hesitancy, the lower vaccine uptake.
(b) Vaccine hesitancy and vaccine uptake will be significantly correlated with coping indicators (though in opposite directions):
The lower vaccine hesitancy, and the higher vaccine uptake, the higher societal and individual resilience, the higher hope and morale, and the lower distress symptoms and sense of danger reported.

5. Method

5.1. Respondents and sample

The respondents constitute a sample of Israeli residents, who answered an online structured questionnaire. The data collection (N = 2002) was conducted by an internet panel company, consisting of approximately 65,000 panelists (https://sekernet.co.il/), on October 8–12, 2021 (Table 1). To enable a representative sample, a stratified sampling method was employed, aligned with the data published by the Israeli Central Bureau of Statistics regarding geographic distribution, gender, and age.

5.2. Study tools

Apart from the vaccine hesitancy scale that was developed specifically for this study, all measurement scales were an abbreviated version of research tools that were used during the COVID-19 pandemic [33]. Shortening the scales was done based on the calculation of the reliability of each scale and the effect of excluding items on the Alpha Cronbach.

COVID-19 vaccines hesitancy scale. The construction of the questionnaire included: (a) Transforming arguments that support or oppose the COVID-19 vaccines into closed questions with a scale ranging between 1 and 5: 1 constituting low vaccine hesitancy, and 5 constituting high vaccine hesitancy. (b) The questions were evaluated by eight content experts for content validity. (c) The tool was pilot tested among 15 respondents that did not participate in the study. (d) Modifying the vaccine hesitancy scale according to the pilot

Table 1
Demographic characteristics of the sample (N = 2002).

| Variable                        | Group          | Sample size | Number | %     | M (SD) |
|--------------------------------|----------------|-------------|--------|-------|--------|
| Age                            | 18-30          | 581         | 29     | 42.18 (15.64) |
|                               | 40-31          | 441         | 22     |        |
|                               | 50-41          | 366         | 18     |        |
|                               | 51-60          | 298         | 15     |        |
|                               | 61-82          | 316         | 16     |        |
| Gender                         | Men            | 985         | 49     |        |
|                               | Women          | 1017        | 51     |        |
| Religiosity                    | Secular        | 927         | 46     | 1.84 (.95) |
|                               | Traditional    | 640         | 32     |        |
|                               | Religious      | 266         | 13     |        |
|                               | Very religious | 169         | 9      |        |
| Political attitudes            | Very left      | 35          | 2      | 3.49 (.89) |
|                               | Left           | 220         | 11     |        |
|                               | Center         | 706         | 35     |        |
|                               | Right          | 816         | 41     |        |
|                               | Very right     | 225         | 11     |        |
| Government support             | 1. Strongly opposes | 477   | 24     | 2.79 (1.26) |
|                               | 2. Opposed     | 280         | 14     |        |
|                               | 3. Does not support or oppose | 561 | 28     |        |
|                               | 4. Support     | 550         | 27     |        |
|                               | 5. Strongly support | 134 | 7      |        |
| Family income compare to average in Israel | Much below | 532 | 27 |        |
|                               | Below          | 441         | 22     |        |
|                               | Average        | 597         | 30     |        |
|                               | Above          | 325         | 16     |        |
|                               | Much above     | 107         | 5      |        |
| Education                      | 1. Elementary  | 31          | 2      | 3.33 (1.06) |
|                               | 2. High school | 488         | 24     |        |
|                               | 3. Higher education | 583 | 29     |        |
|                               | 4. B.A.        | 580         | 29     |        |
|                               | 5. M.A. and above | 320 | 16     |        |
| Nationality                    | Jewish         | 1880        | 94     |        |
|                               | Other          | 122         | 6      |        |
| Family status                  | Bachelor       | 541         | 27     |        |
|                               | Married        | 1158        | 58     |        |
|                               | Divorce        | 169         | 8      |        |
|                               | Widower        | 27          | 1      |        |
|                               | In a relationship | 107 | 6      |        |
| Vaccine status                 | 1. No vaccine  | 222         | 11     |        |
|                               | 2. One vaccine | 98          | 2      |        |
|                               | 3. Two vaccines | 315 | 16     |        |
|                               | 4. Three vaccines | 1367 | 68    |        |
study findings, to ensure clarity of the wordings. The result was a 16-item questionnaire, of which approximately 50% of the items were phrased in a “positive” way (i.e., phrases that support the vaccines), and the other 50% were phrased in a “negative” way, (express apprehension towards the vaccines; see Supplement). After collecting the data, we changed the direction of the positively phrased questions, so that the direction of all the questions was uniform, thus the higher the item scoring, the greater vaccine hesitancy. The Alpha Cronbach reliability of the questionnaire was found to be very high: $\alpha = 0.93$.

**Vaccine uptake.** We asked all respondents to indicate how many vaccines they received: three, two, one, or none.

**Societal resilience (national)** [24]. The original scale is based on four main social components that have been attributed in previous studies to societal resilience: patriotism, optimism, social integration, and trust in political and public institutions. This index has received much research support, both in Israel [34] and in other countries [19]. The original scale included 16 items. In the current study, the abbreviated scale included 5 items. For example: “I have full confidence that the Israeli government makes the appropriate decisions in managing the COVID-19 crisis”. The response scale for societal resilience items ranges from 1 = strongly disagree to 5 = strongly agree. The reliability of the scale in the current study was high: $\alpha = 0.91$.

**Individual resilience (IR).** The original IR scale included ten items. In the present study, we used an abbreviated version of the Connor-Davidson questionnaire that includes two items [35], ranging from 0 = not true at all, to 4 = true almost all the time. Before statistical analysis, we changed the scale to 1–5. The reliability of the two items was found to be fair $\alpha = 0.68$.

**Distress symptoms** [36]. The original BSI scale included six items regarding anxiety and depressive symptoms. The abbreviated version we used in the present study included four items (two items that measure anxiety symptoms and two items that measure depressive symptoms). The response scale to this questionnaire ranges from 1 = not at all to 5 = to a very large extent. For example: “To what extent do you feel your life is in danger due to the coronavirus?” Good reliability was found for this scale in the present study $\alpha = 0.87$.

**Hope index.** This scale was built especially for the COVID-19 studies we conducted in Israel [33]. In constructing the scale, we relied on an earlier scale [38]. The current scale of hope included two items. For example, “I have hope that I will emerge strengthened from the coronavirus”. The reliability of the two items in this study was found to be very good, $\alpha = 0.92$.

**Morale.** Subjects’ morale was tested using one item: “How would you define your morale (mood) these days?” The answer to the question was given on a 5-point scale, between 1 = very bad and 5 = very good.

**Demographic variables.** The variables measured in the present study included: gender, age, education, government support, political attitudes (right-left), marital status, income level, level of religiosity, and area of residence.

5.3. **Statistical analysis**

Correlations between the variables were calculated based on the Pearson correlation test. The variance between groups of vaccines was calculated based on a one-way analysis of variance. To identify the best predictors of both vaccine hesitancy and uptake, AMOS Path Analysis was calculated. All statistical tests were conducted using SPSS version 26.

6. **Results**

The distribution of the vaccine hesitancy and uptake average scores are presented in Table 2; the majority (76%) reported a low level of vaccine hesitancy; 68% received 3 vaccines while only 5% did not receive any vaccine.

To examine our first and second hypotheses, we calculated a Pearson correlation matrix among the examined variables (Table 3). Results indicated the following: (a) Vaccine hesitancy significantly and negatively correlates with vaccine uptake: The lower vaccine hesitancy, the higher vaccine uptake. (b) Societal (SR) and individual resilience (IR), hope, and moral (positive coping indicators) significantly and negatively correlate with vaccine hesitancy: the lower the vaccine hesitancy, the higher societal and individual resilience, hope, and morale reported, and vice versa. (c) Vaccine hesitancy significantly and positively correlates with distress and a sense of danger: the higher the vaccine hesitancy, the higher level of distress and sense of danger, and vice versa. (d) Vaccine uptake

| Table 2 | Distribution of Vaccine hesitancy and uptake average scores (N = 2002). |
|---------|-----------------------------------------------|
| Vaccine hesitancy scale (1–5) | Range of average responses | Response | % |
| Very low vaccine hesitancy | 1–2 | 734 | 36 |
| Low vaccine hesitancy | 2.01–3 | 795 | 40 |
| High vaccine hesitancy | 3.01–4 | 373 | 19 |
| Very high vaccine hesitancy | 4.01–5 | 100 | 5 |
| M = 3.54, SD = .62 |

| Vaccine uptake | Response |
|---------------|----------|
| No vaccine | 0 | 222 | 11 |
| One vaccine dose | 1 | 98 | 5 |
| Two vaccine doses | 2 | 315 | 16 |
| Three or four vaccine doses | 3 | 1367 | 68 |
significantly and positively correlates with SR: the higher vaccine uptake, the higher SR reported, and vice versa. (e) Vaccine uptake is significantly and negatively correlated with a sense of danger: the lower the vaccine uptake, the higher sense of danger, and vice versa. (f) The four positive coping indicators (SR, IR, hope, and morale) significantly and positively correlate with each other, and significantly and negatively correlate with the two negative coping indicators (distress and sense of danger). These main results support our first and second hypotheses.

To better understand the variability between levels of vaccine uptake concerning SR, we calculated a One-way analysis of the variance of the mean SR of three different vaccine uptake groups: those who received three, two, and no vaccine (Table 4). We did not include in this analysis respondents who received only one vaccine (n = 98) as most of them indicated that the main reason for receiving only one vaccine is that they were infected with COVID-19. Our results indicate a significant difference between these three uptake groups (with medium-size effect): the higher the vaccine uptake the higher the level of SR; all groups were significantly different from each other.

To examine which of the psychological and demographic variables (controlling each other) significantly predict vaccine hesitancy and uptake (controlling each other), we used Path Analysis, including the variables that significantly correlated with both vaccine hesitancy and vaccine uptake (see Table 3 and Fig. 1). Results revealed the following: (a) Societal resilience was the best predictor of vaccine hesitancy as well as vaccine uptake: the higher the societal resilience reported, the lower vaccine hesitancy and higher vaccine uptake reported. (b) The higher the sense of danger reported, the higher vaccine hesitancy and the lower vaccine uptake reported. (c) The older the age, the lower vaccine hesitancy and the higher vaccine uptake. (d) The higher the level of religiosity, the lower the level of vaccine uptake. Note that religiosity was not found as a significant predictor of vaccine hesitancy. (e) The higher the family income, the lower vaccine hesitancy. Family income was not found a significant predictor of vaccine uptake. (f) Support in the government and education did not significantly predict vaccine hesitancy and uptake. (g) The six predictors together explained 22% of vaccine hesitancy variance and 15% of vaccine uptake variance.

7. Discussion

The current study examined vaccine hesitancy and uptake, and their associations with resilience, distress, and well-being, among a large sample of Israeli adults. The findings indicate that the public in Israel is divided in its attitude towards vaccines: most of the public support the vaccines and reports a low level of vaccine hesitancy. However, a minority of approximately 24% oppose being vaccinated and report a high level of vaccine hesitancy.

The salient finding of the present study is the association between societal resilience and both vaccine hesitancy and uptake: the higher the level of societal resilience reported by the respondents, the lower vaccine hesitancy and higher vaccine uptake, and vice versa. Furthermore, we found significant differences regarding societal resilience between those who received three, two, or no vaccine.

Table 4
One-way ANOVA, and post-hoc analysis, for SR by vaccine uptake (n = 1904*).

| Vaccine uptake | Respondent | Average SR | S.D. |
|----------------|------------|------------|------|
| 3 vaccines     | 1357       | 3.63       | 1.11 |
| 2 vaccines     | 315        | 3.01       | 1.29 |
| No vaccine     | 222        | 2.57       | 1.04 |
| F(2, 1901)     | 110.51***  |            |      |
| Effect size $\eta^2$ | .104      |            |      |

***p < .001.

* One vaccine uptake group was not included in this analysis.

a Significant Scheffe post-hoc Scheffe.
b Significant Scheffe post-hoc Scheffe.
c Significant Scheffe post-hoc Scheffe.
people who trust the leadership of their state and the state institutions, identify with the country, and perceive social solidarity, present significant paths at \( p < .001 \), thin path indicates non-significant paths at \( p > .05 \). Fig. 1. Standardized estimates of path analyses of psychological and demographic characteristics predicting vaccine hesitancy and uptake. A thick path indicates significant paths at \( p < .001 \), thin path indicates non-significant paths at \( p > .05 \).

Our findings are consistent with previous studies examining the associations between vaccines and general political views and/or conservatism. For example, Baumgaertner et al. [42] reported that conservative respondents are less likely to express pro-vaccination beliefs than other individuals; Murphy et al. (2021) [7] reported that among samples from the UK and Ireland, those resistant to a COVID-19 vaccine were less likely to obtain information about the pandemic from traditional and authoritative sources and had similar levels of mistrust in these sources, compared to respondents that support the vaccination campaign.

In the scientific literature, a long-standing discussion can be noted concerning the association between attitudes and behavior [42], and this debate is still ongoing [43]. Concerning the issue of vaccination, our results present that on the one hand, there is a significant correlation between vaccine hesitancy (attitudes) and the number of vaccines received (actual behavior). On the other hand, based on the correlation between the two variables, there is only a 29% shared variance between the two. One possibility for interpreting our findings is the desire of the respondents to be eligible for a ‘green pass’ that allows them access to recreation activities, restaurants, and additional public places [16]. The inconvenience of non-eligibility to such access may persuade many to overcome their vaccine hesitancy, despite their concerns and limited support for the COVID-19 vaccine. Further research is needed to examine whether other behaviors also present a significant correlation with societal resilience, such as volunteering for the state and society, recycling waste, or maintaining hygienic behavior in public areas.

The results of our study regarding the associations between vaccine hesitancy and demographic characteristics are consistent with earlier studies that found that family income [44] and age [45] are negatively associated with vaccine hesitancy. An unexpected result in our study is the discrepancy between two findings: the significant positive correlation between the level of religiosity and the vaccine hesitancy (the higher level of religiosity, the higher vaccine hesitancy), which is in line with the findings of Edwards et al. [46], and the significant negative correlation between the level of religiosity and the vaccine uptake (the higher level of religiosity, the lower vaccine uptake). Nonetheless, this latter result is consistent with the lower immunization rates among the religious population in Israel (https://www.health.gov.il/Subjects/Equality in Health/information/Documents/inequality-vaccines.pdf). A possible explanation may be the frustration of the religious leaders with the instructions issued by the health governance systems concerning COVID-19, such as the prohibition of gatherings, even for religious traditions (praying together). This frustration may have led to enhanced defiance to comply with actions encouraged by the medical providers [47,48]. Further research is needed to explain this finding.

**Limitations of the study.** There are three main limitations of this study: (a) This is a correlative study, examining associations between variables that do not allow for causal inference. (b) The study is based on a sample of an Internet panel company and does not guarantee a random sample of the entire population of Israel. (c) The Internet company that collected the data does not have a representative sample of non-Jewish populations, so the results of the current study do not necessarily represent minority groups. (d) It should be noted that the State of Israel is unique in aspects related to vaccination during the COVID-19 crisis: Israel received a large shipment of vaccines, soon after their approval, for various reasons. One major reason was the primary healthcare system in Israel which enabled to closely monitor the vaccination campaign, its results in containing the virus, and the side effects. In that sense, Israel served as a “research laboratory” for the pharmaceutical company that produced the vaccine. Consequently, at the end of 2020, Israel was considered to be with the highest percentage of people vaccinated for COVID-19 in the global community. In line with this uniqueness, caution should be exercised in the generalization of the findings to other countries [49].
8. Conclusions

State authorities are making considerable efforts to convince the public that the COVID-19 pandemic still poses a high societal risk and that accordingly, it is vital to be vaccinated, as a precautionary action against future waves, that may potentially be caused by different variants. The findings of the present study suggest that public attitudes are not influenced primarily by information disseminated about the disease or the vaccine, but rather by the degree of trust in the leadership and other components of societal resilience. It is thus advisable to consider means to increase the population’s confidence in the State’s leaders and the ability of leaders, as well as state institutions, to make the right decisions in times of crisis rather than focusing specifically on vaccines. It is recommended that further research initiatives will be made to investigate the impact of increasing transparency concerning COVID-19 decision-making processes and sharing the foundations for making each type of a decision, on vaccine hesitancy and uptake.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijdrr.2022.103181.

References

[1] W.A. Orenstein, Rafi Ah, Simply put: vaccination saves lives, Proc. Natl. Acad. Sci. USA 114 (16) (2017) 4031–4033. Apr 18.
[2] S. Pullan, M. Dey, Vaccine hesitancy and vaccine-anti-vaccine: a Google Trends analysis, Vaccine 39 (14) (2021) 1877–1881.
[3] M. Thelwall, K. Kouhua, S. Thelwall, Covid-19 vaccine hesitancy on English-language Twitter, Prof. Info. (EPI) 30 (2) (2021).
[4] C.S. Wiyounge, D. Nduwemwe, J. Ryan, et al., Vaccine hesitancy in the era of COVID-19: could lessons from the past help in divining the future? Hum. Vaccines Immunother. 8 (2021) 1–3, https://doi.org/10.1080/21645515.2021.1893052. Mar.
[5] M. Sallam, COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates, Vaccine 9 (2) (2021) 160.
[6] P. Verger, E. Dubé, Restoring confidence in vaccines in the COVID-19 era.2020, Expert Rev. Vaccines 19 (11) (2020) 991–995, https://doi.org/10.1080/14760584.2020.1825945. Nov.
[7] J. Murphy, F. Vallières, R.P. Bentall, et al., Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom, Nat. Commun. 12 (1) (2021) 29, https://doi.org/10.1038/s41467-020-20226-9. Jan 4.
[8] P. Soares, J.V. Rocha, M. Moniz, et al., Factors associated with COVID-19 vaccine hesitancy, Vaccine 9 (3) (2021) 300.
[9] S. Machingaidze, C.S. Wiysonge, Understanding COVID-19 vaccine hesitancy, Nat. Med. 27 (8) (2021) 1338–1339.
[10] W.Y.S. Chou, A. Budenz, Considering emotion in COVID-19 vaccine communication: addressing vaccine hesitancy and fostering vaccine confidence, Health Commun. 35 (14) (2020) 1718–1722.
[11] C.M. Valensi, M. Cinelli, M. Nadini, et al., The COVID-19 Infodemic Does Not Affect Vaccine Acceptance, arXiv e-prints, 2021. Jul:arXiv:2107.
[12] M. Cordinh, M.A. Lauri, Attitudes towards COVID-19 vaccination, vaccine hesitancy, and intention to take the vaccine, Pharm. Pract. 19 (1) (2021) 2317.
[13] P.F. Burke, D. Masters, G. Massey, Enablers and barriers to COVID-19 vaccine uptake: an international study of perceptions and intentions, Vaccine 39 (36) (2021) 5116–5128. Aug 23.
[14] K. Grumbach, T. Judson, M. Desai, et al., Association of race/ethnicity with likeliness of COVID-19 vaccine uptake among health workers and the general population in the San Francisco Bay area, JAMA Intern. Med. 181 (7) (2021) 1008–1011. Jul 1.
[15] G.D. Salali, M.S. Uysal, Effective incentives for increasing COVID-19 vaccine uptake, Psychol. Med. 20 (2021) 1–3. Sep.
[16] R. Wilf-Miron, V. Myers, M. Saban, Incentivizing vaccination uptake: the “green pass” proposal in Israel, JAMA 325 (15) (2021) 1503–1504. Apr 20.
[17] B. Rosen, R. Watzberg, A. Israeli, M. Hartal, N. Davidovitch, Addressing vaccine hesitancy and access barriers to achieve persistent progress in Israel’s COVID-19 vaccination program, Isr. J. Health Pol. Res. 10 (1) (2021) 1–20.
[18] M. Bodas, A. Kaim, B. Velan, A. Ziv, E. Jaffe, B. Adini, Overcoming the effect of pandemic fatigue on vaccine hesitancy—will belief in science triumph? J. Nurs. Scholarsh. (2022) https://doi.org/10.1111/jnu.12778.
[19] P. Bertin, K. Nera, S. Delouvé, Conspiracy beliefs, rejection of vaccination, and support for hydroxychloroquine: a conceptual replication-extension in the COVID-19 pandemic context, Front. Psychol. 11 (2020) 2471.
[20] D. Gurwitz, COVID-19 vaccine hesitancy: lessons from Israel, Vaccine 39 (29) (2021) 3785.
[21] C.G. Edwards, H.B. Keywan, Physicians’ perspective on vaccine-hesitancy at the beginning of Israel’s Covid-19 vaccination campaign and public’s perceptions of physicians’ knowledge when recommending the vaccine to their patients: a cross-sectional study, Front. Public Health 10 (2022).
[22] B. Stanislawski, The coping circumplex model: an integrative model of the structure of coping with stress, Front. Psychol. 10 (2019) 694.
[23] C.J. Ballads, J.R. Benzion, M.C. Carmelo, et al., Bouncing back from COVID-19: individual and ecological factors influence national resilience in adults from Israel, the Philippines, and Brazil, J. Community Appl. Soc. Psychol. (2021) 1–24.
[24] S. Kimhi, Y. Eshel, Measuring national resilience: a new short version of the scale (NR-13), J. Community Psychol. 47 (3) (2019) 517–528.
[25] R.J. Ferreira, F. Buttell, C. Cannon, COVID-19: immediate predictors of individual resilience, Sustainability 12 (16) (2020) 6495.
[26] S. Kimhi, Y. Eshel, H. Marciano, B. Adini, A renewed outbreak of the COVID-19 pandemic: a longitudinal study of distress, resilience, and subjective well-being, Int. J. Environ. Res. Publ. Health 17 (21) (2020) 7743. Oct 23.
[27] J.L. Cénat, C. Blais-Rochette, C.K. Koupou-Kpolou, et al., Prevalence of symptoms of depression, anxiety, insomnia, posttraumatic stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: a systematic review and meta-analysis, Psychiatr. Res. 295 (2020 Jan), 113599.
[28] G.A. Bonanno, S.S. Romero, S.I. Klein, The temporal elements of psychological resilience: an integrative framework for the study of individuals, families, and communities, Psychol. Inq. 26 (2) (2015) 139–169.
[29] Y. Eshel, S. Kimhi, Postwar recovery to stress symptoms ratio as a measure of resilience, individual characteristics, sense of danger, and age, J. Loss Trauma 21 (2) (2016) 160–177. Mar 3.
H. Wang, Q. Xia, Z. Xiong, et al., The psychological distress and coping styles in the early stages of the 2019 coronavirus disease (COVID-19) epidemic in the general mainland Chinese population: a web-based survey, PLoS One 15 (5) (2020), e0233410.

C.R. Snyder, L.M. Irving, J.R. Anderson, in: C.R. Snyder, D.R. Forsyth (Eds.), Hope and Health in Handbook of Social and Clinical Psychology: the Health Perspective, vol. 15, Pergamon Press, New York, NY, 1991, pp. 285–305.

O.S. Shaban, Z. Al-Zubi, N. Ali, A. Alqotaish, The effect of low morale and motivation on employees’ productivity & competitiveness in Jordanian industrial companies, Int. Bus. Res. 10 (7) (2017) 1–7.

S. Kimhi, Y. Eshel, H. Marcianno, B. Adini, Fluctuations in National resilience along the COVID-19 – a longitudinal study, Int. J. Environ. Res. Publ. Health 18 (2021) 3876.

H. Marcianno, Y. Eshel, S. Kimhi, Predictors of individual, community and national resilientities of Israeli jews and arabs, Int. J. Psychol. 55 (4) (2020) 553–561.

L. Campbell-Sills, M.B. Stein, Psychometric analysis and refinement of the Connor–Davidson resilience scale (CD-RISC): validation of a 10-item measure of resilience, J. Trauma Stress 20 (6) (2007) 1019–1028.

Derogatis LR, Savitz KL. The SCL–90–R and brief symptom inventory (BSI) in primary care. In M. E. Maruish (Ed.), Handbook of Psychological Assessment in Primary Care Settings (pp. 297–334). Lawrence Erlbaum Associates Publishers.

Z. Solomon, E. Prager, Elderly Israeli Holocaust survivors during the Persian Gulf War: a study of psychological distress, Am. J. Psychiat. 149 (12) (1992) 1707–1710. Dec.

M. Jurymowicz, D. Bar-Tal, The dominance of fear over hope in the life of individuals and collectives, Eur. J. Soc. Psychol. 36 (3) (2006) 367–392.

S.C. Quinn, J. Parmer, V.S. Freimuth, K.M. Hilyard, D. Musa, K.H. Kim, Exploring communication, trust in government, and vaccination intention later in the 2009 H1N1 pandemic: results of a national survey, Biosecur. Bioterrorism Biodefense Strategy, Pract. Sci. 11 (2) (2013) 96–106.

K.S. Valcheva, How does Trust in government influence vaccination attitudes? ПУБЛИЧНИ ПОЛИТИКИ bg 13 (2) (2022) 178–190.

A. Coman, M.C. Sandu, V.M. Leoveanu, A.M. Grigore, A multidisciplinary approach to leadership during the COVID 19 era. The case of Romania, in: International Conference on Human-Computer Interaction 2022, Springer, Cham, 2022, pp. 503–516, 503-516.

B. Baumgaertner, J.E. Carlisle, F. Justwan, The influence of political ideology and trust on willingness to vaccinate, PLoS One 13 (1) (2018), e0191728.

R.H. Fazio, How do attitudes guide behavior? in: R.M. Sorrentino, E.T. Higgins (Eds.), Handbook of Motivation and Cognition: Foundations of Social Behavior Routledge, 1986, pp. 204-243. Guilford Press.Hill RJ. Attitudes and behavior. In Social psychology 2017; 347-377.

S.A. Bono, Faria de Moura, E. Villela, et al., Factors affecting COVID-19 vaccine acceptance: an international survey among Low-and Middle-Income Countries, Vaccine 9 (5) (2021) 515.

E. Robertson, K.S. Reeve, C.L. Niedzwiedz, et al., Predictors of COVID-19 vaccine hesitancy in the UK household longitudinal study, Brain Behav. Immun. 94 (2021) 41–50.

B. Edwards, N. Bidde, M. Gray, K. Solis, COVID-19 vaccine hesitancy and resistance: correlates in a nationally representative longitudinal survey of the Australian population, PLoS One 16 (3) (2021), e0248892.

F. Weiden, M. Levinsky, M. Schiff, N. Becker, R. Pat-Horenczyk, R. Benbenishty, COVID-related concerns, the need for help, and perceived microaggression among young ultra-orthodox jewish respondents in Israel, Int. J. Environ. Res. Publ. Health 18 (12) (2021), Jan 6445.

A. Fridman, R. Genihon, A. Gneezy, COVID-19 and vaccine hesitancy: a longitudinal study, PLoS One 16 (4) (2021), e0250123.

S. Glied, Strategy drives implementation: COVID vaccination in Israel, Isr. J. Health Pol. Res. 10 (1) (2021) 1–2.