SSM - Mental Health 7 (2025) 100445

Contents lists available at ScienceDirect

SSM - Mental Health

journal homepage: www.journals.elsevier.com/ssm-mental-health

# Civic engagement during crisis: Does volunteering buffer the impact of trauma on worsening physical and mental health?

Sharon Stein Merkin *, Liat Orenstein

*Gerntner Institute of Epidemiology and Health Policy Research, Sheba Medical Center, Tel Hashomer, Israel*

ARTICLE INFO

Handling Editor: Dr A C Tsai

*Keywords:*
Civic engagement
Volunteering
War-related trauma
Mental and physical health
Sleep

ABSTRACT

*Introduction:* Experiences of trauma impact mental and physical health; civic engagement, including volunteering, may alleviate trauma-related health consequences.

*Research objective:* Examine the association between war-related trauma and worsening health outcomes, and how volunteering may buffer the harmful health effects of trauma.

*Methods:* We administered a population-based survey of Israelis ages 18+, with a total sample of n = 1129. Trauma exposure was assessed since the war onset (October 7, 2023) and included direct (witnessed/experienced) and indirect (experienced by family/close friend) violent trauma, displacement (experienced), and seeking sheltering frequently from rocket attacks (experienced). Data on volunteering type and intensity was collected; health outcomes included self-reported worse physical health, mental health, sleep and initiating ≥3 negative health behaviors since October 7th.

*Results:* Multivariable results showed robust associations between indirect violent trauma, displacement and worsening health outcomes and some association between direct violent trauma and worse sleep and behaviors, after adjustment for co-occurring trauma exposure, sociodemographic factors, social wellbeing and volunteering. The association between displacement and worse mental health was limited to non-volunteers. We also found indication of health risk associated with engaging in ≥3 volunteering activities.

*Conclusions:* Results show physical and mental health effects of exposure to war-related trauma and suggest that volunteering may prevent worsening mental health but may contribute to worsening physical health. Research is needed to determine the longer-term effects of volunteering post-trauma. Focusing on a social intervention, civic engagement, to mitigate pathological processes related to traumatic stress may lead to innovative ways to promote wellbeing in times of crisis.

## 1. Scientific background

The invasion, massacre and kidnapping of 1451 Israelis that took place on October 7, 2023, and the ensuing war, led to country-wide exposure to varying degrees of psychological trauma. In addition to those who experienced or directly witnessed physical (and often gruesome) violence during the initial attack, a large portion of the population learned of a traumatic event that occurred to a family member, friend or acquaintance. Moreover, over 250,000 Israeli citizens were internally displaced due to the war, and a majority of the country's citizens sought shelter from missile attacks (The Institute for National Security Studies (INSS), 2024). This trauma exposure is ongoing due to the continuing war, the death of hundreds of soldiers representing loss across the Israeli population given mandatory army service, as well as civilian hostages who remain in enemy captivity.

Remarkably, in the wake of the catastrophic events of October 7th in Israel, an initial report estimated that 50% of the population had been engaged in volunteering efforts during the first few weeks of the war (Almog-Bar et al., 2023). Indeed, engagement in prosocial behavior post-trauma has been documented elsewhere in cases of individually experienced trauma (Frazier et al., 2013), and collectively experienced trauma, such as terrorist attacks (Steffen and Fothergill, 2009; Piferi et al., 2006) and natural disasters (Twigg and Mosel, 2017). The phenomenon of volunteerism in Israel, however, is extraordinary in both population percentages and in scope of activity across population groups (Almog-Bar et al., 2023). This population-wide spontaneous volunteering, as well as ubiquitous trauma exposure across geographic areas, socioeconomic levels, ethnic and age groups, allow for a unique

* Corresponding author.
*E-mail addresses:* sharonm@gertner.health.gov.il (S.S. Merkin), liato@gertner.health.gov.il (L. Orenstein).

https://doi.org/10.1016/j.ssmmh.2025.100445
Received 21 January 2025; Received in revised form 2 April 2025; Accepted 11 April 2025
Available online 12 April 2025

opportunity to assess the role of this type of social and civic engagement in potentially buffering the negative health impact of trauma.

Experiences of psychological trauma, both from man-made and natural disasters, have been shown to negatively impact mental and physical health. Studies have shown associations between experiencing psychological trauma and negative mental health outcomes, including increased stress, anxiety, depression and post-traumatic stress disorder (PTSD) (Karam et al., 2014; Rogowska and Pavlova, 2023; Levi-Belz et al., 2024; Hogg et al., 2023; Shamir-Stein et al., 2024). Although research is more limited with regard to physical health outcomes related to traumatic experiences, studies have found increased risk of physical conditions related to experiences of trauma, including pain, gastrointestinal disorders, and cardiometabolic disease (Sowder et al., 2018; Koenen et al., 2017). Other post-traumatic symptoms include poor sleep quality (Rogowska and Pavlova, 2023; Shamir-Stein et al., 2024; Maher et al., 2006), one of the main physiological processes leading to PTSD (Rogowska and Pavlova, 2023) as well as to cardiovascular disease risk (Baranwal et al., 2023; Lloyd-Jones et al., 2022; McFarlane, 2010). Harmful health behaviors have also been found associated with experiences of trauma, including accumulating evidence of an uptick in such behaviors during the current conflict in Israel, such as increased substance abuse, less adherence to a healthy diet and less physical activity (Shamir-Stein et al., 2024; Feingold et al., 2024). In excess and over time, these behaviors can lead to disease progression and morbidity (Lloyd-Jones et al., 2022); indeed, research has provided evidence of behavioral changes as pathways linking trauma exposure to disease (Sowder et al., 2018; Koenen et al., 2017; Buckley et al., 2004). While studies have shown increased risk of PTSD and post-traumatic symptoms associated with cumulative trauma exposure, including the number of experienced traumatic events and/or proximity to the location of the event (Karam et al., 2014; May and Wisco, 2016), as well as type of trauma (Levi-Belz et al., 2024; May and Wisco, 2016), there is less information as to differential physical health changes and behaviors by types of trauma exposure.

Research has suggested that engaging in post-trauma prosocial behavior, including volunteering and helping others, may alleviate trauma-related symptoms such as involuntary intrusions of traumatic memories (Varma and Hu, 2022) and PTSD (Xu et al., 2024), and improve emotional wellbeing among trauma victims, for example by increasing positive affect and perceived meaningfulness (Frazier et al., 2013; Steffen and Fothergill, 2009; Xu et al., 2024; Adams and Boscarino, 2015). Likewise, studies following the September 11, 2001 terrorist attacks in New York City, found that spontaneous volunteerism promoted personal healing, increased levels of affinity for one's community, and was a method of coping with the traumatic stress (Steffen and Fothergill, 2009; Adams and Boscarino, 2015). Less is known about the physical health benefits of prosocial behavior post-trauma, however, studies have shown various physical health benefits related to prosocial behavior such as volunteering, including reduced risk of cardiovascular disease and mortality (Estrella et al., 2020; Burr et al., 2018; Okun et al., 2013). Other research has suggested that civic engagement, broadly defined as "activities that benefit the public good," including volunteer activities, are generally expected to improve mental and physical health, although research is limited (Nelson et al., 2019; Ballard et al., 2019). A major challenge in assessing the positive effects of volunteering is the consideration of confounding factors that may be associated with both volunteering and health, including social wellbeing measures such as social support, social integration and resilience (Nichol et al., 2023; Levine et al., 2021).

The objectives of this study were to 1) examine the association between experiences of war-related trauma and emotional and physical health, and 2) to assess how the phenomenon of volunteering in Israel in the aftermath of the events of October 7th and the ensuing war may have served as a buffer to the harmful emotional and physical health effects of ongoing trauma.

## 2. Methods

### 2.1. Study sample and data collection

We administered a population-based survey to a sample of n = 1143 Israelis aged 18 and older utilizing an internet panel company, representing diverse geographic areas and age groups. The adult survey panel consists of over 45,400 eligible members aged 18 or older who have consented to be contacted about survey participation; Sekernet, the panel company, follows guidelines established by the global association for market, social and opinion researchers (ESOMAR) (Passingham et al.). Using a quota sampling approach, participants were recruited to generally reflect the Israeli population in terms of age, sex and geographic distribution according to the Israel Central Bureau of Statistics (ICBS); a second stage of stratified sampling ensured approximately equal samples from the following age groups: 18–34, 35–49, 50 and older, as well as from the following geographic regions: north, center and south. In this way, we over-sampled older adults and peripheral regions of the country in order to ensure adequate representation of these usually under-represented groups. Institutional Review Board approval was obtained on March 19, 2024 from the authors' institution; participant consent was requested at the beginning of the survey and based on survey completion. The survey was administered and completed between April and May 2024.

Of the initial n = 1143 participants who responded to the survey, 1 was excluded due to illogical responses in multiple domains, and an additional 13 were excluded due to missing data on trauma exposure, leaving a total of n = 1129 for the analytic sample.

### 2.2. Main exposure: trauma

Participants were asked if they have experienced any of a list of traumatic events related to the events of October 7th, 2023 in Israel and the ensuing war, including military or civilian physical injury, assault, death or kidnapping, displacement, and seeking shelter from rocket attacks. Types of traumatic events were then classified according to Criterion A of the most recent Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2022) to reflect both direct and indirect trauma. Direct traumatic events were considered those directly experienced or witnessed by the participant, and included actual or threatened death, serious injury, violent assault or kidnapping occurring to a civilian or military person, referred to in this study as "direct violent" trauma. Due to unique events occurring during this period in Israel, additional direct traumatic events included displacement from home (mandatory or voluntary) due to proximity to war zones, and frequently seeking shelter from incoming missile attacks (both only considered direct for those who reported experiencing the event). Since over 80% of the study sample reported seeking shelter, we limited the latter type of trauma to those whose permanent address was in an area with at least 100 missile attacks during this study period, based on public data from Israel's Home Front Command (mostly in the southern and Tel Aviv regions during this period). (National Emergency Portal) An "indirect violent" traumatic event was defined as learning that death, serious injury, violent assault or kidnapping (civilian or military) occurred to a family member or close friend. Each of the 4 types of trauma exposure (direct violent, displacement, seeking shelter frequently and indirect violent) were defined as binary (yes or no), with the possibility of multiple types of exposure per participant.

### 2.3. Effect modifier: civic engagement and volunteering

Volunteering activity since October 7th was the main form of civic engagement assessed in this study. Participants were asked to report the type, duration and frequency of activities; for each type, participants were also asked whether they had ever engaged in similar activities before October 7th. Types of activities included common types of initiatives in Israel since October 7th, mostly dedicated to helping bereaved families, families of hostages, injured civilians and soldiers, evacuated families, and families of soldiers called for reserve duty (see list in Fig. 1). In these analyses, we considered volunteering as reporting participation in any of these volunteering activities (yes or no), excluding financial donations. Volunteering intensity categories were determined based on frequency and duration during the study period (first 6 months of the war), and classified as low (<several times a month for some of the weeks), medium ( ≥ several times a month for some weeks and/or less frequently for all weeks), or high ( ≥ several times a month all weeks). A count of volunteering activities was also considered, and classified as none, 1–2, or 3 or more different types of activities.

In sensitivity analyses, we included an alternate measure of civic engagement that included attending protests or rallies during this time (mostly reflecting political protests or rallies in support of the hostages and their families).

### 2.4. Main outcomes: worsening physical and mental health

Outcomes for this study included participant perceptions of worse physical and mental health, as well as worse sleep (a marker of both mental (Baranwal et al., 2023; Scott et al., 2021) and physical (Maher et al., 2006; Prins et al., 2015) health), and the initiation of negative health behaviors since October 7th. Assessment of worse physical health (yes or no) was based on participants' responses of "a little worse" or "much worse" when asked to compare their current overall physical health to before October 7th (vs. same, a little better or much better). The same responses were considered worse mental health when asked to compare their current overall emotional and mental health to before October 7th. Worse sleep was also considered as a binary outcome, and based on participant reports of any of the following changes since October 7th: 1) sleeping fewer hours a night, 2) increased difficulty sleeping, or 3) initiation of sleep medication. The initiation of negative health behaviors was also a binary outcome, and defined as reporting at least 3 of the following 6 behavior changes since October 7th (corresponding to the approximate highest quartile of the number of negative health behaviors): worse sleep (as defined above), less physical activity, weight gain, increased consumption of snack foods, increased frequency or started smoking, increased amount or started drinking alcohol.

### 2.5. Potential confounders

Potential confounders of the associations between trauma, volunteering and health, included several sociodemographic and psychosocial measures that have been identified in other research as factors associated with trauma, volunteering and/or health outcomes (Adams and Boscarino, 2015; Nichol et al., 2023; Levine et al., 2021; Horev and Avni, 2016), and thus might explain apparent associations between trauma, volunteering and health outcomes. Sociodemographic factors included age (continuous and age groups: 18–34, 35–49 vs 50+), sex, immigration status, religion/ethnicity, marital status, number of people in household, education, income, employment, living in the peripheral regions. Peripheral areas were defined based on a peripherality score calculated by the Israel Central Bureau of Statistics (ICBS) that reflects both accessibility to other localities (weighted by population size) as well as distance from the Tel Aviv area, the economic and business center of the country; these values were then standardized and classified into a score of 1–10, with 1 indicating the most peripheral areas and 10 indicating the most central (Israel Central Bureau of Statistics, 2019). Health disparities research in Israel has long been concerned with the vulnerability of those living in peripheral areas with more limited health care access and services (Horev and Avni, 2016). ICBS peripherality scores were assigned to participants' residential areas based on reported locality of residence, and scores of 1–4 (out of 10) were considered peripheral or very peripheral areas, as per ICBS criteria (Israel Central Bureau of Statistics, 2019). Sociodemographic measures are further described in detail in Table 1.

We also accounted for the health status of participants before October 7th, including reported diagnoses of hypertension, high cholesterol, high glucose/diabetes or heart disease, and for reported experiences of trauma before October 7th (a general question asking about any direct or witnessed experiences of physical abuse, assault, unexpected death of close relative or fatal accident). In addition, we considered three measures of social wellbeing, including social support, social integration and resilience. The Single Item Measure of Social Support (SIMSS) (Slavin et al., 2020) was used to assess social support (yes or no; defined as having at least 2 people in your life that you can count on for help in times of trouble or difficulty); social integration was defined as feeling part of a community (yes or no; responses of "agree" or "strongly agree"). The abbreviated Connor-Davidson Resilience Scale (CD-RISC) (Vaishnavi et al., 2007) was used to assess individual resilience, based on sum of responses to 2 questions asking about the ability to adapt to change and the tendency to bounce back after hardship (Likert scale from 0- not at all to 4-nearly all the time; total score ranging from 0 to 8 indicating low to high resilience).

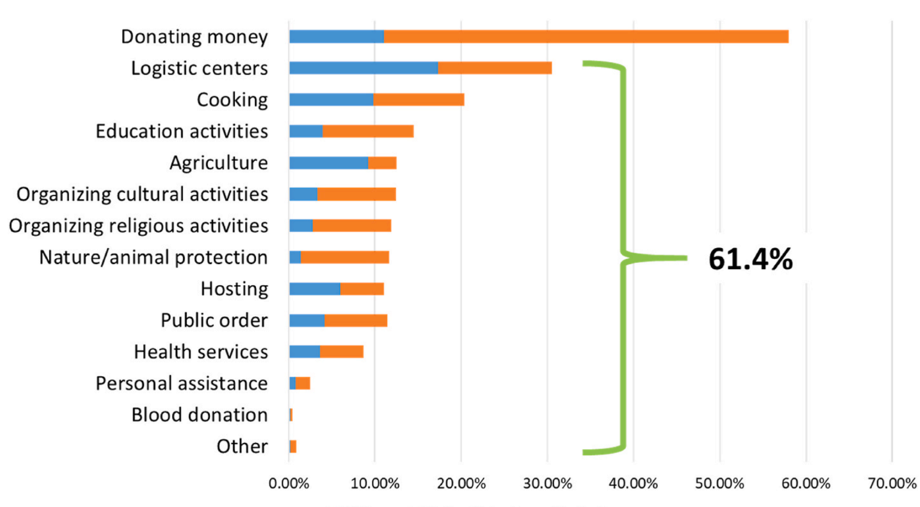


**Fig. 1.** Reported volunteering in Israel since October 7th, 2023 (n = 1129).

**Table 1**
Characteristics of the study sample, n = 1129.

| | Study Sample n = 1129 | | Any Trauma[a] n = 600 | |
|---|---|---|---|---|
| *Socio-demographics* | n | % | n | % |
| Age Group | | | | |
| 18–34 | 382 | 33.8 | 229 | 38.2[b] |
| 35–49 | 380 | 33.7 | 199 | 33.2 |
| 50+ | 367 | 32.5 | 172 | 28.7 |
| Sex | | | | |
| Male | 569 | 50.4 | 296 | 49.3 |
| Female | 560 | 49.6 | 304 | 50.7 |
| Immigrant | 194 | 17.2 | 93 | 15.5 |
| Religion/Ethnicity | | | | |
| Jewish (non-Ultra Orthodox) | 926 | 82.0 | 512 | 85.3[b] |
| Jewish Ultra Orthodox | 103 | 9.1 | 50 | 8.3 |
| Muslim | 52 | 4.6 | 16 | 2.7 |
| Druze | 14 | 1.2 | 10 | 1.7 |
| Christian, Other | 34 | 3.0 | 12 | 2.0 |
| Marital Status | | | | |
| Married | 683 | 60.5 | 351 | 58.5 |
| Separated/Divorced/Widowed | 135 | 12.0 | 74 | 12.3 |
| Single | 311 | 27.5 | 175 | 29.2 |
| Number Household Members (mean ± SD) | 1129 | 3.7 ± 1.9 | 600 | 3.8 ± 1.8[b] |
| Education | | | | |
| High school with no Bagrut | 83 | 7.4 | 34 | 5.7 |
| High School with Bagrut | 219 | 19.4 | 120 | 20.0 |
| Vocational | 269 | 23.8 | 137 | 22.8 |
| First degree or higher | 529 | 46.9 | 293 | 48.8 |
| Yeshiva (religious seminary) | 29 | 2.6 | 16 | 2.7 |
| Household Monthly Income (NIS; before taxes) | | | | |
| Lowest tertile (<10,999) | 362 | 32.1 | 178 | 29.7 |
| Middle tertile (11,000–16,999) | 321 | 28.4 | 185 | 30.8 |
| Highest tertile (≥17,000) | 382 | 33.8 | 210 | 35.0 |
| Refuse/Don't know | 64 | 5.7 | 27 | 4.5 |
| Employment | | | | |
| Unemployed | 148 | 13.1 | 81 | 13.5 |
| Employed | 890 | 78.8 | 481 | 80.2 |
| Retired | 91 | 8.1 | 38 | 6.3 |
| Living in Peripheral Area [c] | 274 | 24.3 | 161 | 26.8[b] |
| *Current Health Conditions Pre Oct 7th* | | | | |
| Prevalence of High Blood Pressure | 160 | 14.2 | 74 | 12.3 |
| Prevalence of High Glucose | 133 | 11.8 | 67 | 11.2 |
| Prevalence of High Cholesterol | 237 | 21.0 | 117 | 19.5 |
| Prevalence of Heart Disease | 53 | 4.7 | 27 | 4.5 |
| *Social Wellbeing* | | | | |
| High Social Support | 768 | 68.0 | 421 | 70.2 |
| High Social Integration | 712 | 63.1 | 394 | 65.7 |
| Resilience Score (mean ± SD) | 1129 | 5.7 ± 1.6 | 600 | 5.7 ± 1.6 |
| Previous Traumatic Experiences | 384 | 34.0 | 247 | 41.2[b] |
| *Types of Trauma Exposure Since Oct 7th* | | | | |
| Direct Violent | 104 | 9.2 | 104 | 17.3[b] |
| Indirect Violent | 425 | 37.6 | 425 | 70.8[b] |
| Displacement | 102 | 9.0 | 102 | 17.0[b] |
| Seek Shelter Frequently | 194 | 17.2 | 194 | 32.3[b] |
| *Volunteering* | | | | |
| Any Volunteering Activity[d] | 693 | 61.4 | 436 | 72.7[b] |
| Volunteering Intensity | | | | |
| None | 436 | 38.6 | 164 | 27.3[b] |
| Low | 271 | 24.0 | 154 | 25.7 |
| Medium | 165 | 14.6 | 102 | 17.0 |
| High | 257 | 22.8 | 180 | 30.0 |
| Number of Different Volunteering Activities | | | | |
| 0 | 436 | 38.6 | 164 | 27.3[b] |
| 1–2 | 444 | 39.3 | 249 | 41.5 |
| 3+ | 249 | 22.1 | 187 | 31.2 |
| Previously Volunteered | 573 | 50.8 | 373 | 62.2[b] |
| *Worsening Health Since Oct 7th* | | | | |
| Worse physical health | 196 | 17.4 | 139 | 23.2[b] |
| Worse mental health | 382 | 33.8 | 238 | 39.7[b] |
| Worse sleep | 562 | 49.8 | 361 | 60.2[b] |
| Worse health behaviors | 281 | 24.9 | 194 | 32.3[b] |

NIS: New Israeli Shekel.
[a] Any of the 4 types of trauma exposure: direct violent, indirect violent, displacement or seeking shelter frequently.
[b] P-value<0.05 for difference between any trauma and overall sample.
[c] Based on Israel Central Bureau of Statistics peripherality score of <5.
[d] Excluding financial donations.

### 2.6. Statistical analysis

We examined distributions of the various types of trauma exposure, volunteering intensity and counts, and health outcomes, as well as all covariates of interest. Unadjusted associations between trauma and health outcomes were assessed using chi-square statistics to determine statistical significance.

Logistic regression models were utilized to examine the association between exposure to trauma (by type) and each of the 4 binary physical and mental health outcomes (worse physical health, mental health, sleep and initiation of 3+ negative health behaviors). Models were incrementally adjusted for sociodemographic measures and pre-October 7th health status and previous experience of trauma (potential confounders), then additionally for indicators of social wellbeing (social support, integration and resilience). Volunteering measures (intensity and count) were then included in the model, as well as a variable indicating previous volunteering. Since there was some indication of collinearity between moderate levels of intensity and moderate number of volunteering activities, we included indicators of low, medium, high volunteering intensity (vs no volunteering), as well as an indicator of a high number of volunteering activities (3 or more). Finally, we assessed the role of volunteering in modifying the health effects of exposure to trauma by including interaction terms in each model for any volunteering and each type of trauma; where statistically significant, trauma-health models were stratified by volunteering status (yes or no). In sensitivity analyses, we expanded the definition of civic engagement to include non-volunteering activities (attending protests, rallies).

Considering the high prevalence of some of the outcome variables, and in order to allow for a more intuitive interpretation of the multivariable models, we estimated average marginal effects (AMEs) by comparing average predicted probabilities of the outcomes in traumatized vs non-traumatized groups, averaged over the observed covariate distribution (Muller and MacLehose, 2014). This approach provides interpretable estimates of the absolute change in probability associated with each exposure, adjusting for all other variables in the model (Norton et al., 2019). For each binary predictor, we reported the predictive margins (adjusted probabilities) for each level, and their differences (AMEs), along with standard errors based on model-estimated variance. All analyses were conducted using SAS version 9.4; SAS Margins Macro (SAS Institute Inc) was used to estimate predictive margins and AMEs.

## 3. Results

Distributions of sociodemographic measures in the study sample (Table 1) indicate a slightly younger sample (median age of 41), an under-representation of minority populations, and higher educational attainment and employment compared to general Israeli population distributions estimated by the ICBS for 2023 (ICBS national data: median age of 45, 16% Muslim, 37% only completed high school, 67% employment for the general population). (Israel Central Bureau of Statistics) Descriptive results for the study sample show widespread experiences of trauma, with 37.6% of participants reporting having learned of a violent assault or death of a family member or close friend, and 17.2% seeking shelter frequently due to missile attacks. Remarkably, in the wake of the catastrophic events of October 7th in Israel, we also found that an estimated 61.4% of the population engaged in volunteering efforts during the first 6 months of the war (list of types of activities in Fig. 1), a higher proportion than previously estimated (Almog-Bar et al., 2023). Of those who volunteered, 39.7% did so with high intensity for at least one of the reported volunteer activities, and 35.9% of volunteers reported engaging in 3 or more different types of volunteering activities. Approximately half the participants reported volunteering in the past.

With regard to health outcomes, our results show that 17.4% of the sample reported worse physical health since October 7th, 33.8%

reported worse mental health, 49.8% experienced worse sleep patterns, and 24.9% initiated 3 or more negative health behaviors. All distributions for variables of interest are listed in Table 1, as are the distributions for those who experienced any form of direct or indirect trauma. Those distributions indicate that individuals traumatized were significantly more likely to be younger, Jewish (not Ultra-Orthodox) and to volunteer; this group also had a slightly higher proportion of Druze participants, and larger households. There were no significant differences in socioeconomic status or pre- October 7th health for the traumatized and non-traumatized individuals.

Fig. 2 illustrates unadjusted findings of associations between exposure to direct and indirect violent traumatic events and all 4 health outcomes. Displacement was significantly associated with most of the outcomes, aside from worse mental health; seeking shelter frequently was not significantly associated with any of the health outcomes.

Multivariable results showed strong and significant associations between specific types of trauma and worsening health, after adjustment for co-occurring trauma exposure, and all other covariates (odds ratios and 95% confidence intervals for incremental models including all covariates, with and without volunteering, are listed in Supplemental Tables S1–S4). These results showed inconsistent findings with regard to the role of volunteering in modifying these associations, including indication of a buffering effect between displacement and worsening mental health. Findings are described in detail below for each type of trauma exposure; AMEs are presented in Table 2 by trauma type, indicating the difference in probability (described here in percentage points) between average predicted probabilities of each outcome for those reporting that type of trauma vs those who did not. Fig. 3 further illustrates these AMEs by including the predictive margins for each of the exposed groups so that the offset of additional probability risk posed by the trauma exposure can be observed (Norton et al., 2019).

*Direct violent trauma:* Despite indication of associations between exposure to direct violent trauma and all worsening health outcomes in unadjusted analyses (Fig. 2), these associations only remained statistically significant for worse sleep and health behaviors, after adjusting for other forms of trauma exposure and all covariates (10.5% increase in predicted probability of worse sleep and 10.8% of worse health behaviors; see Table 2). Interaction terms between direct violent trauma and volunteering were not statistically significant with respect to any of the health outcomes.

*Indirect violent trauma:* The associations between exposure to indirect violent trauma and worsening health outcomes remained significant for most outcomes (aside from worse health behaviors) after adjustment for all covariates, and were most pronounced for worse sleep (14.4% increased predicted probability of worse sleep; 9.3% and 9.9% of worse physical health and mental health, respectively). Interaction terms between indirect violent trauma and volunteering were not statistically significant with respect to any of the health outcomes.

*Displacement:* Displacement during the war was significantly associated with worse physical health, sleep and health behaviors (but not worse mental health) after adjusting for all covariates. The most pronounced association was with regard to worse sleep and health behaviors, with a 15.8% increase in predicted probability of worse sleep for those displaced, and a 15.6% increased probability of worse health behaviors. Interaction terms showed a significant interaction only between displacement and volunteering and the association with worse mental health ($p = 0.03$); stratified models (Table 3) showed no association between displacement and worse mental health among volunteers (0.20% decrease in predicted probability that was not statistically significant) and a strong and significant association among displaced non-volunteers (22.0% increase in predicted probability for those displaced vs. not displaced). For the remaining outcomes, interaction terms between displacement and volunteering were not statistically significant.

*Seeking shelter:* As in unadjusted results, there were no significant associations between seeking shelter frequently and worsening health outcomes; interaction terms with volunteering were not statistically significant.

*Volunteering and Health:* While not the main objective of this analysis, when including volunteering in the fully adjusted models, we found unexpected associations between some of the volunteering measures and 2 of the health outcomes. There was a 7.5% increased predicted probability of worsening physical health for those reporting 3 or more volunteering activities and a 10.2–10.9% increase predicted probability of worse health behaviors for those reporting medium-high intensity volunteering (Table 2).

In sensitivity analyses, only an additional 28 participants were added to the civic engagement group when considering the expanded definition to include attending protests and rallies in addition to volunteering; results were similar when analyses were repeated using this definition (data not shown).

## 4. Discussion

This study provided a unique opportunity to assess the role of civic engagement alongside ongoing experiences of direct and indirect war-related trauma in a national sample of Israeli adults during an ongoing war. While some research in Israel has begun to observe health outcomes related to trauma experienced in this war (Levi-Belz et al., 2024;

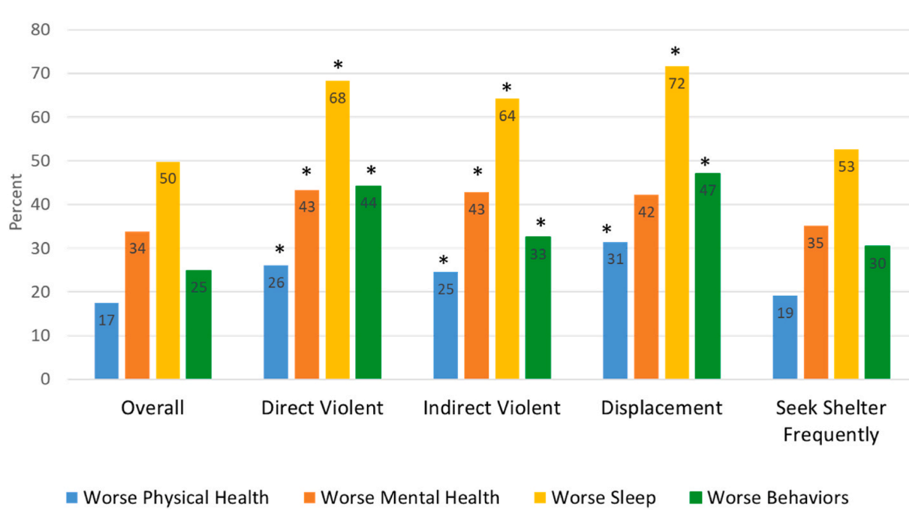


**Fig. 2.** Worsening health since October 7th by type of trauma (Unadjusted)
*p-value for chi-squared test <0.05.

**Table 2**
Average marginal effects of worsening health since October 7th by trauma type and volunteering.

| Trauma Type | Worse Physical Health | | Worse Mental Health | | Worse Sleep | | Worse Health Behaviors | |
|---|---|---|---|---|---|---|---|---|
| | AME | SD | AME | SD | AME | SD | AME | SD |
| Direct Violent | 0.034 | 0.040 | 0.074 | 0.051 | **0.105**[b] | 0.052 | **0.108**[b] | 0.047 |
| Indirect Violent | **0.093**[d] | 0.026 | **0.099**[c] | 0.031 | **0.144**[d] | 0.032 | 0.038 | 0.027 |
| Displacement | **0.098**[b] | 0.045 | 0.052[e] | 0.051 | **0.158**[c] | 0.053 | **0.156**[c] | 0.050 |
| Seek Shelter Frequently | 0.025 | 0.032 | −0.014 | 0.037 | −0.010 | 0.039 | 0.027 | 0.034 |
| **Volunteering Intensity** | | | | | | | | |
| Low intensity | 0.011 | 0.033 | 0.048 | 0.040 | 0.020 | 0.039 | 0.073[a] | 0.038 |
| Medium intensity | 0.005 | 0.039 | 0.074 | 0.048 | −0.017 | 0.047 | **0.109**[b] | 0.047 |
| High Intensity | −0.005 | 0.038 | 0.068 | 0.048 | 0.056 | 0.049 | **0.102**[b] | 0.047 |
| Ref: no volunteering | | | | | | | | |
| **3 + Volunteering Activities** | **0.075**[b] | 0.036 | 0.028 | 0.040 | 0.071[a] | 0.043 | 0.067[a] | 0.037 |

AME: Average Marginal Effects; SD: Standard Deviation; Ref: Reference.
[a] $0.05 \le p < 0.1$.
[b] $0.01 \le p < 0.05$.
[c] $0.001 \le p < 0.01$.
[d] $p < 0.001$.
[e] Interaction term with volunteering was statistically significant, see Table 3.

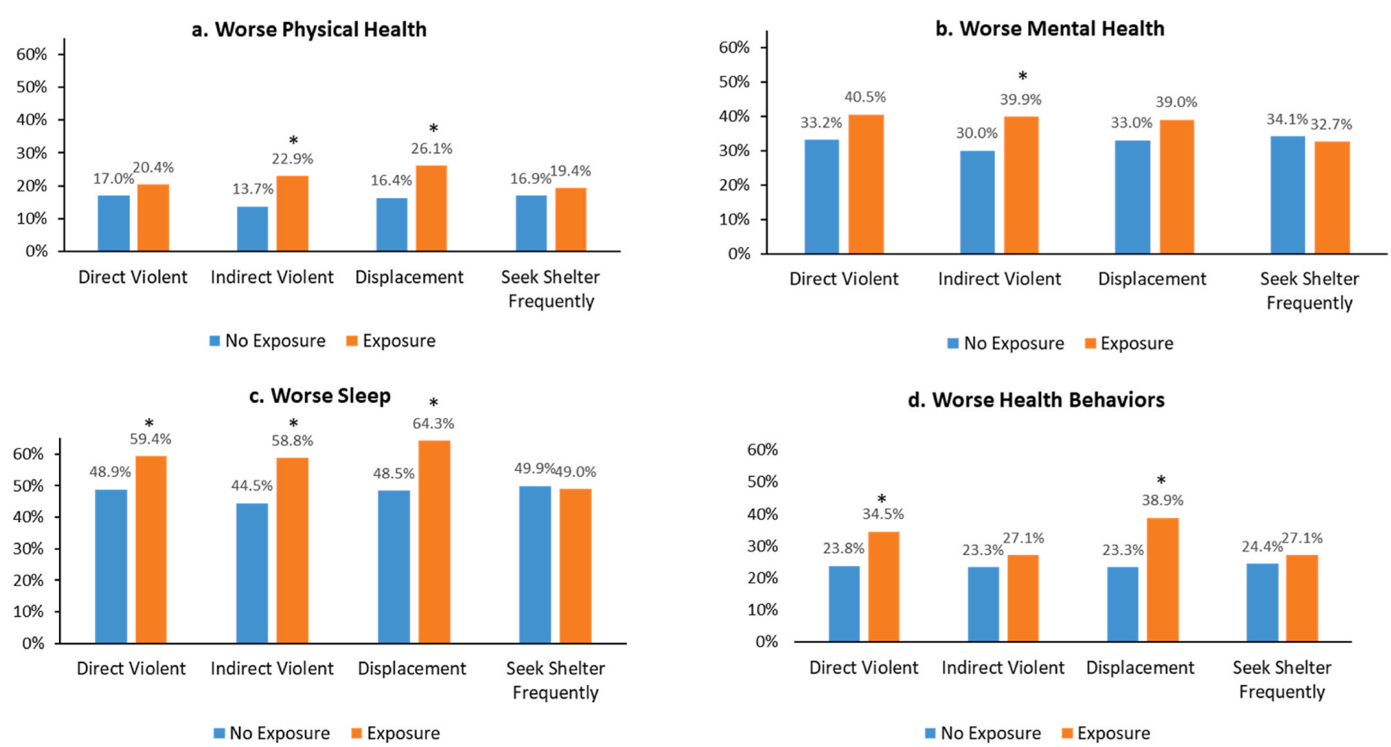


**Fig. 3.** Adjusted predicted probability of health outcomes by trauma type.
*p-value for difference between exposed and not exposure to trauma type <0.05.

Shamir-Stein et al., 2024), this is the first study to address the role of civic engagement in this process.

Results from this study show widespread experiences of trauma across the population, as well as extensive volunteering activity. Our findings, described in detail below, provide strong evidence for short-term health changes related to experiences of war-related trauma, as well unique evidence regarding volunteering patterns and behaviors during crisis.

### 4.1. Trauma and health

Our findings highlight the short-term health consequences for individuals experiencing two types of trauma in particular during the current war in Israel, indirect violent trauma (learning that close family members or friends experienced violent trauma) and displacement. We found strong and consistent associations between these experiences and general worsening physical health and in particular, worse sleep, even after adjustment for other forms of trauma, sociodemographic factors, baseline health status, social wellbeing and volunteering. Translating these associations into adjusted predictive probabilities allows for a more direct understanding of the public health ramifications. As shown in Fig. 3, the high predicted probability of deteriorating mental health (40%) and sleep (60%) associated with indirect violent trauma, highlights an immediate and urgent public health need for allocating mental health resources to address both direct and indirect forms of violent trauma. Even more striking, we show that the experience of

**Table 3**
Average marginal effects of worse mental health since October 7th by trauma type and volunteering.

| Trauma Type | Worse Mental Health | | | |
|---|---|---|---|---|
| | Volunteering, n = 693 | | Not Volunteering, n = 436 | |
| | AME | SD | AME | SD |
| Direct Violent | 0.098[a] | 0.056 | −0.119 | 0.096 |
| Indirect Violent | **0.106**[c] | 0.038 | **0.115**[b] | 0.052 |
| Displacement [d] | −0.002 | 0.061 | **0.220**[b] | 0.093 |
| Seek Shelter Frequently | −0.000 | 0.050 | −0.042 | 0.053 |

AME: Average Marginal Effects; SD: Standard Deviation.
[a] $0.05 \leq p < 0.1$.
[b] $0.01 \leq p < 0.05$.
[c] $0.001 \leq p < 0.01$.
[d] Difference in average marginal effects between volunteering and not volunteering statistically significant ($p < 0.05$).

displacement is associated with the highest predicted probability of each of the 4 negative health outcomes compared to the other experiences of trauma, including 26% for worse physical health, 64% for worse sleep, 39% for worse health behaviors (Fig. 3), and 50% for worse mental health among non-volunteers (Fig. 4). Volunteering seemed to buffer the effects of trauma only with regard to displacement and mental health; our results showing no difference in predicted probabilities of worse mental health among displaced volunteers (37% for both displaced and non-displaced individuals), but much higher probability of 50% for those displaced and not volunteering (vs 27% for non-displaced) (Fig. 4).

Other studies have indeed shown that experiencing indirect trauma can have serious mental health implications (May and Wisco, 2016), although few studies have considered the physical health effects. Our findings indeed confirm the research showing profound mental health implications of learning of loved ones experiencing violent trauma or death (May and Wisco, 2016; Nash and Litz, 2013). Unfortunately, this form of war-related trauma has been ubiquitous in Israel during this time, with our reported 40% likely an underestimate, considering the ongoing war-related casualties after this study was conducted.

Research has also found mental health implications related to displacement, with a recent study showing that Israelis displaced during this war have increased anxiety and depression as well as lower reported physical health-related quality of life compared to those not displaced (Hamama et al., 2025). According to Israel's National Emergency Management Authority, an estimated 253,000 Israeli citizens were internally displaced from their homes at the start of the war (both mandatory and voluntary); about half this number of Israelis remain displaced 14 months into the war (The Institute for National Security Studies (INSS), 2024). While various government agencies in Israel are addressing some of the needs for victims of both these types of trauma, including the availability of emotional support, (Israel Ministry of Health) financial assistance, (State of Israel National Insurance Institute) and expanded healthcare services, (Clalit Health Services) specific physical health consequences of these experiences may be overlooked and not the focus of care. Sleep, as shown in our study, may be a specific way this type of trauma manifests physically and an opportunity to both identify those at risk, and to intervene before these symptoms progress. Our findings also confirm initial reports showing increased harmful health behaviors among those displaced (Shamir-Stein et al., 2024), and provide evidence that those experiencing displacement are at higher risk of engaging in harmful health behaviors, possibly due to disrupted routines, diet and household structure. However, along with the negative health consequences of displacement, our study shows associated worse mental health only among non-volunteers, suggesting that engaging in volunteering may provide a buffer to the harmful emotional aspects of displacement.

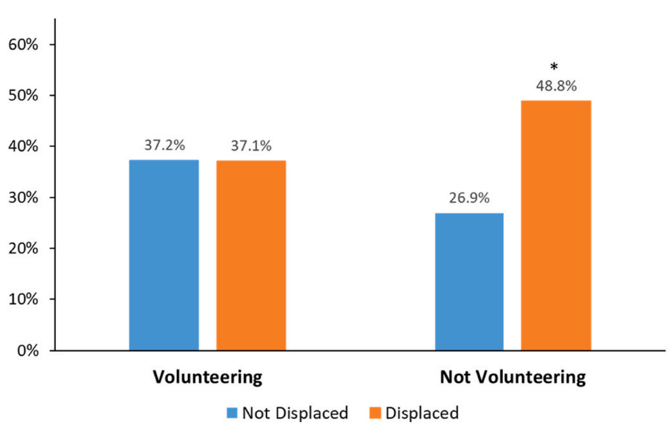


**Fig. 4.** Adjusted predicted probability of worse mental health by displacement and volunteering.
*p-value for difference between displaced and not displaced <0.05.

The association between direct experiences of violent trauma and health were less robust across health outcomes, and only statistically significant for worse sleep and initiating negative health behaviors. The lack of a robust association for the other health outcomes may be an indication that other forms of trauma are driving these associations when various types of war-related trauma co-occur. Moreover, this group in our study sample may be particularly resilient and civically engaged compared to the general population experiencing this type of trauma. Some indication of this includes their participation in the survey soon after such an experience and that 89% of this group engaged in volunteering (much higher percentage than the overall 61.4%).

Finally, these findings did not show any statistically significant associations between seeking shelter frequently and any of the adverse health outcomes. It is important to note, however, that 80% of the sample population sought shelter from rocket attacks at some point during this period of the war. It is possible that the common experience of running for shelter, as well as the extensive public guidelines, general availability of protected spaces, and an advanced air defense system, may lessen the traumatic nature of these experiences. Rocket attacks, however, increased significantly in the northern and central regions of the country after this initial survey, and thus planned follow-up surveys will provide additional insight as to the health impact of more frequent and intense experiences of seeking shelter during an attack.

### 4.2. *The role of volunteering*

Our findings show some indication of the anticipated buffering effects of volunteering in the association between trauma and health (specifically for those displaced), but also indication of unexpected health risks associated with volunteering, particularly with regard to engaging in a high number or intense frequency/duration of volunteering activities.

The most striking indication of interaction between trauma, volunteering and health is the strong association between the experience of displacement and worse mental health only apparent among non-volunteers, with no such association among volunteers (Table 3, Fig. 4). This finding suggests that volunteering may indeed buffer the negative impact of displacement on worsening mental health. Interestingly, a recent Israeli study comparing displaced and non-displaced persons in Israel found that self-mastery and a sense of meaning in life are important factors promoting resilience in displaced persons (Hamama et al., 2025); these factors align with some of the benefits shown from volunteering (Frazier et al., 2013), thus supporting the idea that this type of civic engagement may contribute to positive coping and resilience among those displaced.

In addition to some of the positive effects of volunteering, however, we also found some indication of health risk associated with these activities. As shown in Table 2, engaging in 3 or more volunteering activities was significantly associated with worsening physical health (as well as indication of this association, although not statistically significant, for worse sleep and health behaviors); volunteering at higher intensity levels was also associated with worse health behaviors.

We propose three main ways to understand these unexpected findings of worsening health associated with volunteering. First, high-intensity volunteering may take a physical toll, as other research suggests (Anderson et al., 2014), and that might explain why the health risk we observed was specifically related to intensity and high number of volunteering activities. Spending an excessive amount of time and physical exertion engaged in these activities may directly affect physical health and sleep. Second, many of the volunteering activities may have amplified experiences of war-related trauma, for example, by visiting injured soldiers in rehabilitation or assisting bereaved families or families of hostages still held in captivity, in a way that is similar to how researchers describe shared trauma (generally attributed to situations where mental health care providers and patients experience the same communal disasters) (Baum, 2010). Finally, the robust association between volunteering and initiating negative health behaviors (Table 2) highlights a unique aspect of volunteering mid-trauma, i.e. in the midst of ongoing conflict, when individuals exposed to traumatic events may seek prosocial behavior such as volunteering to cope with the trauma (Lowe and Fothergill, 2003), and may be simultaneously engaging in other negative coping behaviors (including substance abuse and stress eating). This pattern of multiple coping strategies, both positive and negative, has been found in other research on coping behaviors during crisis and is referred to as the "panic-coping cycle." (Huang et al., 2020) In our study, the negative health behaviors we observed may be contributing to the worsening health outcomes, and overshadowing the positive coping behavior (volunteering). Longitudinal data are needed to assess the long-term effects of volunteering on health post-trauma, as well as the continued patterns of both positive and negative coping behaviors.

### 4.3. Strengths and limitations

Data obtained in this study include a unique set of measures that allow for the assessment of ongoing experiences of direct and indirect war-related trauma alongside volunteering activity and self-reported health outcomes in a geographically diverse community-based Israeli population sample. Moreover, the proposed study includes a detailed classification of types of trauma exposure, distinguishing between direct and indirect trauma. Aside from the detailed measures of trauma exposure, the study considered both mental and physical health measures, when other studies often focus on one or the other (McFarlane, 2010), as well as information on health behaviors. Considering the proximity of the survey administration to October 7th and the ongoing conflict, this study also had the advantage of assessing trauma exposure, volunteering efforts and immediate health behavior changes in a 6 month period.

While there is always a concern of recall bias related to both questions about past trauma exposure and self-reported health changes, we have attempted to minimize this bias by administering the surveys as proximate to the time of the events as possible (6 months after October 7th), and including measures of changing health since that time rather than static measures of health. Health measures were self-reported, perhaps introducing response bias, with traumatized individuals inaccurately over-reporting health deterioration; although research has shown that health perception is an important predictor of mortality (Lorem et al., 2020). In addition, we attempted to minimize "healthy user bias," suggesting that healthier individuals will choose to volunteer and thus appear to have lower trauma-health risk (or that unhealthy individuals chose to stop volunteering), by adjusting models for various characteristics reflecting pre October 7th health status, aspects of social wellbeing that may be related to volunteering and driving the trauma-health associations, as well as past volunteering behavior. Indeed, volunteers did not appear to be healthier or less traumatized, rather we found evidence of the opposite trend; participants who reported the most trauma also reported the highest levels of volunteering (89% of those exposed to direct violent trauma; 78% of those exposed to indirect trauma) and there was no statistically significant association between pre-Oct 7th health status and volunteering (data not shown). An additional limitation of this study may thus be related to the participation of individuals who are more civically engaged (specifically those who experienced direct and indirect violent trauma), and thus not reflective of the general population. If this is the case, however, then associations observed in this study would only underestimate the health impact of these types of trauma.

### 4.4. Conclusions and implications

These findings provide evidence of robust associations between exposure to specific types of war-related trauma and short-term physical and mental health effects within a 6 month period, as well as some indication that volunteering in moderation may buffer some of these effects. Type, intensity and number of volunteering activities may be important factors to consider in order to maintain balance for individuals undergoing trauma. Indeed, we have also shown hints of a potential panic-coping cycle among traumatized individuals, who appear to be even more engaged in volunteering and thus perhaps more vulnerable to the harmful effects of related over-exertion. These results indicate the need for continued follow-up to better understand the role of civic engagement in providing long-term protection from the physical and mental health impact of traumatic stress, as well as the potentially harmful effects of volunteering in excess.

Overall, research findings from this study can contribute to the evaluation of current health policies and to the establishment of new interventions and programs to support and treat victims of various forms of trauma. Focusing on a social intervention, civic engagement, that may mitigate or prevent pathological processes related to traumatic stress while promoting positive changes post-trauma, may lead to innovative ways to alleviate individual-level disease processes by utilizing community-level social interventions that simultaneously promote wellbeing and resilience at both the individual and community levels.

## CRediT authorship contribution statement

**Sharon Stein Merkin:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Liat Orenstein:** Writing – review & editing, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

## Data accessibility statement

The data obtained for this study are stored as per IRB-approved guidelines. These data study can be made available to researchers upon request and per study guidelines.

## 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.

## Acknowledgments

This research was funded by Sheba Medical Center.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmmh.2025.100445.

## References


Adams, R., Boscarino, J., 2015. Volunteerism and well-being in the context of the World Trade Center terrorist attacks. Int. J. Emerg. Ment. Health 17 (1), 274–282.

Almog-Bar, M., Bar, R., Barkai, R., Marmus, H., 2023. Civil society engagement in Israel during the Iron Swords war: emerging trends and preliminary insights. The Institute for the Study of Civil Society and Philantropy in Israel at. Hebrew University of Jerusalem, Jerusalem.

American Psychiatric Association, 2022. Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision. American Psychiatric Association, Washington, DC.

Anderson, N., Damianakis, T., Kröger, E., Wagner, L., Dawson, D., Binns, M., Cook, S., 2014. The benefits associated with volunteering among seniors: a critical review and recommendations for future research. Psychol. Bull. 140 (6), 1505.

Ballard, P., Hoyt, L., Pachucki, M., 2019. Impacts of adolescent and young adult civic engagement on health and socioeconomic status in adulthood. Child Dev. 90 (4), 1138–1154.

Baranwal, N., Phoebe, K., Siegel, N., 2023. Sleep physiology, pathophysiology, and sleep hygiene. Prog. Cardiovasc. Dis. 77, 59–69.

Baum, N., 2010. Shared traumatic reality in communal disasters: toward a conceptualization. Psychother. Theor. Res. Pract. Train. 47 (2), 249–259.

Buckley, T., Mozley, S., Bedard, M., Dewulf, A., Greif, J., 2004. Preventive health behaviors, health-risk behaviors, physical morbidity, and health-related role functioning impairment in veterans with post-traumatic stress disorder. Mil. Med. 169 (7), 536–540.

Burr, J., Han, S., Lee, H., Tavares, J., Mutchler, J., 2018. Health benefits associated with three helping behaviors: evidence for incident cardiovascular disease. J. Gerontol.: Ser. Bibliogr. 73 (3), 492–500.

Clalit Health Services. Special services for evacuees from the south and the north [Online]. Available: https://www.clalit.co.il/he/october23war/Pages/otef23.aspx. (Accessed 3 November 2024).

Estrella, M., Kelley, M., Durazo-Arvizu, R., Gallo, L., Chambers, E., Perreira, K., Zeng, D., Giachello, A., Isasi, C., Wu, D., Lash, J., Daviglus, M., 2020. Volunteerism and cardiovascular health: the HCHS/SOL sociocultural ancillary study. Health Behav Policy Rev 7 (2), 120–135.

Feingold, D., Neria, Y., Bitan, D., 2024. PTSD, distress and substance use in the aftermath of October 7th, 2023, terror attacks in Southern Israel. J. Psychiatr. Res. 174, 153–158.

Frazier, P., Greer, C., Gabrielsen, S., Tennen, H., Park, C., Tomich, P., 2013. The relation between trauma exposure and prosocial behavior. Psychological Trauma: Theory, Res. Pract. Policy 5 (3), 286.

Hamama, L., Sarid, O., Hamama-Raz, Y., 2025. Psychological distress, resources, and coping strategies among evacuees and non-evacuees from an armed conflict zone: a network analysis. Stress Health 41 (1), e3525.

Hogg, B., Gardoki-Souto, I., Valiente-Gómez, A., Rosa, A., Fortea, L., Radua, J., Moreno-Alcázar, A., 2023. Psychological trauma as a transdiagnostic risk factor for mental disorder: an umbrella meta-analysis. Eur. Arch. Psychiatr. Clin. Neurosci. 273 (2), 397–410.

Horev, T., Avni, S., 2016. Strengthening the capacities of a national health authority in the effort to mitigate health inequity-the Israeli model. Isr. J. Health Pol. Res. 5, 19.

Huang, L., Lei, W., Xu, F., Liu, H., Yu, L., 2020. Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak: a comparative study. PLoS One 15 (8), e0237303.

Israel Central Bureau of Statistics. Social survey generator [Online]. Available: https://www.cbs.gov.il/en/Pages/Social-Survey-Generator-new.aspx. (Accessed 31 December 2024).

Israel Central Bureau of Statistics, 2019. Society in Israel: gaps between center and periphery, report No. 11, Jerusalem [Online]. Available: https://www.cbs.gov.il/he/publications/DocLib/2019/rep_11/accessibility.pdf. (Accessed 31 December 2024).

Israel Ministry of Health. Coping with emergencie [Online]. Available: https://ironswords.health.gov.il/en/coping-with-emergency/. (Accessed 3 November 2024).

Karam, E., Friedman, M., Hill, E., Kessler, R., McLaughlin, K., Petukhova, M., Koenen, K., et al., 2014. Cumulative traumas and risk thresholds: 12-month PTSD in the World Mental Health (WMH) surveys. Depress. Anxiety 31 (2), 130–142.

Koenen, K., Sumner, J., Gilsanz, P., Glymour, M., Ratanatharathorn, A., Rimm, E., Kubzansky, L., 2017. Post-traumatic stress disorder and cardiometabolic disease: improving causal inference to inform practice. Psychol. Med. 47 (2), 209–225.

Levi-Belz, Y., Groweiss, Y., Blank, C., Neria, Y., 2024. PTSD, depression, and anxiety after the October 7, 2023 attack in Israel: a nationwide prospective study. EClinicalMedicine 68, 102418.

Levine, G., Cohen, B., Commodore-Mensah, Y., Fleury, J., Huffman, J., Khalid, U., et al., 2021. Psychological health, well-being, and the mind-heart-body connection: a scientific statement from the American heart association. Circulation 143 (10), e763–e783.

Lloyd-Jones, D., Allen, N., Anderson, C., Black, T., Brewer, L., Foraker, R., Grandner, M., Lavretsky, H., Perak, A., Sharma, G., Rosamond, W., 2022. American heart association. Life's essential 8: updating and enhancing the American heart association's construct of cardiovascular health: a presidential advisory from the American heart association. Circulation 146 (5), e18–e43.

Lorem, G., Cook, S., Leon, D., Emaus, N., Schirmer, H., 2020. Self-reported health as a predictor of mortality: a cohort study of its relation to other health measurements and observation time. Sci. Rep. 10 (1), 4886.

Lowe, S., Fothergill, A., 2003. A Need to Help: Emergent Volunteer Behavior after September 11. Beyond September 11th: an Account of Post-Disaster Research. University of Colorado.

Maher, M., Rego, S., Asnis, G., 2006. Sleep disturbances in patients with post-traumatic stress disorder: epidemiology, impact and approaches to management. CNS Drugs 20 (7), 567–590.

May, C., Wisco, B., 2016. Defining trauma: how level of exposure and proximity affect risk for posttraumatic stress disorder. Psychol. Trauma: Theory Res. Pract. Policy 8 (2), 233.

McFarlane, A., 2010. The long-term costs of traumatic stress: intertwined physical and psychological consequences. World Psychiatry 9 (1), 3.

Muller, C., MacLehose, R., 2014. Estimating predicted probabilities from logistic regression: different methods correspond to different target populations. Int. J. Epidemiol. 43 (3), 962–970.

Nash, W., Litz, B., 2013. Moral injury: a mechanism for war-related psychological trauma in military family members. Clin. Child Fam. Psychol. Rev. 16 (4), 365–375.

National Emergency portal, Alerts history [Online]. Available. http://www.oref.org.il/heb/alerts-history. (Accessed 17 June 2024).

Nelson, C., Sloan, J., Chandra, A., 2019. Examining Civic Engagement Links to Health: Findings from the Literature and Implications for a Culture of Health. RAND Corporation, Santa Monica.

Nichol, B., Wilson, R., Rodrigues, A., Haighton, C., 2023. Exploring the effects of volunteering on the social, mental, and physical health and well-being of volunteers: an umbrella review. Voluntas 1–32.

Norton, E., Dowd, B., Maciejewski, M., 2019. Marginal effects-quantifying the effect of changes in risk factors in logistic regression models. JAMA 321 (13), 1304–1305.

Okun, M., Yeung, E., Brown, S., 2013. Volunteering by older adults and risk of mortality: a meta-analysis. Psychol. Aging 28 (2), 564–577.

J. Passingham, R. Baker, D. Harding and A. Cannon, "ESOMAR/GRBN Guideline for Researchers and Clients Involved in Primary Data Collection. ESOMAR," [Online]. Available: https://esomar.org/uploads/attachments/cktim86vi054wsptru81egz40-guideline-on-primary-data-collection-final.pdf. [Accessed 6 January 2025].

Piferi, R., Jobe, R., Jones, W., 2006. Giving to others during national tragedy: the effects of altruistic and egoistic motivations on long-term giving. J. Soc. Pers. Relat. 23, 171–184.

Prins, A., Bovin, M., Kimerling, R., Kaloupek, D., Marx, B., Pless Kaiser, A., Schnurr, P., 2015. Primary care PTSD screen for DSM-5 (PC-PTSD-5) [Measurement instrument] [Online]. Available: https://www.ptsd.va.gov. (Accessed 5 September 2024).

Rogowska, A., Pavlova, I., 2023. A path model of associations between war-related exposure to trauma, nightmares, fear, insomnia, and posttraumatic stress among Ukrainian students during the Russian invasion. Psychiatry Res. 328, 115431.

SAS Institute Inc. Sample 63038: predictive margins and average marginal effects [Online]. Available: http://support.sas.com/kb/63038. (Accessed 27 March 2025).

Scott, A., Webb, T., Martyn-St James, M., Rowse, G., Weich, S., 2021. Improving sleep quality leads to better mental health: a meta-analysis of randomised controlled trials. Sleep Med. Rev. 60, 101556.

Shamir-Stein, N., Feldblum, I., Rotman, E., Cohen, S., Brand, E., Kivity, S., Saban, M., 2024. Exploring the self-reported physical and psychological effects in a population exposed to a regional conflict. J. Community Health 49, 674–681.

Slavin, V., Creedy, D., Gamble, J., 2020. Single Item measure of social supports: evaluation of construct validity during pregnancy. J. Affect. Disord. 272, 91–97.

Sowder, K., Knight, L., Fishalow, J., 2018. Trauma exposure and health: a review of outcomes and pathways. J. Aggress. Maltreat. Trauma 27 (10), 1041–1059.

State of Israel National Insurance Institute. Updates and information in relation to the war [Online]. Available: https://www.btl.gov.il/English%20Homepage/Updates-security-situation/Pages/default.aspx. (Accessed 3 November 2024).

Steffen, S., Fothergill, A., 2009. 9/11 volunteerism: a pathway to personal healing and community engagement. Soc. Sci. J. 46 (1), 29–46.

The Institute for National Security Studies (INSS), 2024. INSS insight No. 1838 [Online]. Available: https://www.inss.org.il/publication/evacuation/. (Accessed 25 December 2024).

Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. Environ. Urbanization 29 (2), 443–458.

Vaishnavi, S., Connor, K., Davidson, J., 2007. An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: psychometric properties and applications in psychopharmacological trials. Psychiatry Res. 152 (2–3), 293–297.

Varma, M., Hu, X., 2022. Prosocial behaviour reduces unwanted intrusions of experimental traumatic memories. Behav. Res. Ther. 148, 103998.

Xu, D., Li, Y., Ye, Y., 2024. Turning pain into strength: prosocial behaviours in coping with trauma. Eur. J. Psychotraumatol. 15 (1), 2330302.