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Protective factors and predictors of vulnerability to chronic stress: A comparative study of 4 communities after 7 years of continuous rocket fire

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ABSTRACT

Many communities across the world are chronically exposed to extreme violence. Responses of residents from a city and rural community in Southern Israel, both exposed to 7 years of daily mortar fire, were compared to residents from demographically, socio-economically and geographically comparable non-exposed control samples to examine protective factors and predictors of vulnerability to chronic war-related attacks. Samples from a highly exposed city (Sderot) and a highly exposed rural community region (Otef Aza), along with a demographically comparable comparison non-exposed city (Ofakim) and non-exposed rural community region (Hevel Lachish), were obtained in 2007 using Random Digit Dialing. In total, 740 individuals (81.8% participation rate) were interviewed about trauma exposure, mental health, functioning and health care utilization. In the highly exposed city of Sderot, 97.8% of residents had been in close proximity to falling rockets; in the highly exposed rural community region of Otef Aza, 95.5% were similarly exposed. Despite exposure to chronic rocket attacks, residents of Otef Aza evidenced little symptomatology: only one person (1.5%) reported symptoms consistent with probable posttraumatic stress disorder (PTSD) and functioning levels did not differ from those of non-exposed communities. In contrast, posttraumatic stress (PTS), distress, functional impairment and health care utilization were substantially higher in the highly exposed city of Sderot than the other three communities. Lack of resources was associated with increased vulnerability among city residents; predictors of PTS across all samples included being female, older, directly exposed to rockets, history of trauma, suffering economic loss, and lacking social support. Increased community solidarity, sense of belonging and confidence in authorities may have served a protective function for residents of rural communities, despite the chronic attacks to which they were exposed.

Many communities across the world are chronically exposed to extreme violence. For example, over the past two decades, both Palestinian and Israeli civilian populations have been repeatedly exposed to the consequences of political violence. The Palestinian people have experienced intense military measures that have resulted in substantial levels of psychological symptomatology among both adolescents and adults (Al-Krenawi, Graham, & Kanat-Maymon, 2009; Hobfoll, Canetti-Nisim, & Johnson, 2006). The Israeli civilian population has been exposed to wars and repeated waves of violence that have led to substantial levels of psychological symptomatology as well (Bleich, Gelkopf, Melamed, & Solomon, 2006; Palmieri, Canetti-Nisim, Galea, Johnson, & Hobfoll, 2008; Solomon, 1995). Indeed, studies on the impact of war, political violence and terrorism around the world have identified a range of detrimental mental and physical health effects on residents, including posttraumatic stress (PTS) symptoms (Miguel-Tobal, Cano-Vindel, Gonzalez-Ordi, & Iruarrizaga, 2006; Rubin et al., 2007; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002), anxiety and depression (Hobfoll, Tracy, & Galea, 2006), use of psychotropic medication (Druss & Marcus, 2004), drug and alcohol use (Schiff, Zweig, Benbenishty, & Hasin, 2007), and health problems (Holman & Silver, 2011).

Of course, not everyone responds to adversity with distress and symptomatology (Bonanno, 2004; Seery, Holman, & Silver, 2010). Low levels of adverse consequences may be facilitated by the

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presence of a variety of protective factors and a number of community factors promoting resilience to trauma exposure have recently been identified (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). For example, communities with high levels of social cohesion, organized social networks, and strong social institutions demonstrate remarkable resilience when exposed to traumatic conditions (Kaplan, Matar, Kamin, Sadan, & Cohen, 2005; Somer et al., 2008; Wicke & Silver, 2009), and a sense of collective mastery among residents promotes resilience under stressful circumstances (Hobfoll, Jackson, Hobfoll, Pierce, & Young, 2002). Previous research in Israel found that residents of rural communities fared better emotionally under stressful conditions than residents of urban communities (Blumstein et al., 2004; Kaplan et al., 2005). Community residents from the kibbutzim surrounding Gaza reported fewer PTS symptoms following missile attacks compared to inhabitants from Sderot, a city also under attack (Dekel & Nuttman-Shwartz, 2009); authors speculated that the ideology, solidarity, social resources (Hobfoll, Tracy, & Galea, 2006) and communal lifestyle provided a measure of protection against stress. Similarly, a recent study of adolescent survivors of a terrorist attack in Beslan, Russia observed that collectivistic values, a sense of community, and cultural resources may have been protective of the development of trauma-related symptoms (Moscardino, Scrimin, Capello, & Altoe, 2010).

Even residents of communities that are indirectly exposed to political violence and terrorism show psychological effects (Bleich et al., 2006; Druss & Marcus, 2004; Gelkopf, Solomon, Berger, & Bleich, 2008; Silver et al., 2002), but here, too, variability in response across communities is evident (Gelkopf et al., 2008; Schlenger et al., 2002). This is likely a function of differences in ethnic, economic, ideological and social composition across communities, with each possessing different resources and risk factors. Thus, the impact of exposure to political violence may depend on the wider social context in which it occurs. This context can be defined by geography (proximity to a disaster) as well as by social factors (Kawachi & Subramanian, 2006). Indeed, Nakagawa and Shaw (2004) observed that within the same cities, neighborhoods recovered at different rates depending upon the available social capital, and Kawachi and Berkman (2001) have discussed the importance of availability of social connections as a buffer against the impact of disasters. Residents of poorer communities (Ahern & Galea, 2006) and communities with a narrow range of economic resources (Adger, 2000; Cutter et al., 2006) appear more vulnerable to stressful conditions. Furthermore, war and political violence can cause or worsen local stressful social and material conditions such as poverty, social marginalization, isolation, inadequate housing and changes in family structure and functioning (Miller & Rasmussen, 2010), which can exacerbate mental health problems.

In addition to contextual and community risk factors, individual risk factors in the development of PTS and distress following exposure to potentially traumatic events have also been identified (see Norris et al., 2002, for a review). For example, female gender (Rubin et al., 2007; Silver et al., 2002; Solomon, 1995), younger age (Schlenger et al., 2002), immigration status (Bleich et al., 2006), low education (North et al., 1999), moderate religiosity (vs. secular or orthodox) (Hobfoll, Canetti-Nisim, & Johnson, 2006), income loss (Schuster et al., 2001), prior exposure to traumatic life events (North et al., 1999; Schuster et al., 2001), proximity (North et al., 1999), ongoing sense of threat (Bleich, Gelkopf, & Solomon, 2003; Schuster et al., 2001), lack of social support (Brewin, Andrews, & Valentine, 2000), lack of optimism (Bleich et al., 2003), and coping by means of avoidance, denial or disengagement (Silver et al., 2002) have all been associated with increased psychopathology after a disaster or exposure to a terrorist attack specifically. However, limited research has examined the relative importance of these individual vs. community-level factors. It is possible that an exploration of both kinds of variables might help explain variability in psychological response to potentially traumatic circumstances, both within and across communities.

In the present study, we sought to examine both community-related as well as individual-level risk and protective factors following chronic exposure to potentially traumatic conditions. To do so, we identified two different kinds of communities – assumed to vary on protective characteristics – that had been exposed to chronic war-related violence. Sderot, a city of 19,300 inhabitants in the south of Israel, as well as the surrounding rural community region known as Otef Aza ("Around Gaza"), with about 25,000 inhabitants, were under constant rocket fire from 2000 to 2008, in the form of mortar shelling and Qassam missile attacks (steel 3–10 km-range artillery rockets with a load of 1–10 kg). By the end of 2008, 4246 mortar bombs had fallen on this region, resulting in 15 fatalities and over 450 injuries, significant damage to homes and property, and disturbance to daily living (Ministry of Foreign Affairs, 2011). We sought to assess and compare the prevalence and predictors of PTS symptomatology, global distress, functioning, and health care utilization among residents in these two highly exposed communities. Thus, we surveyed representative samples of residents of the highly exposed city (EC) of Sderot and the highly exposed rural community (ERC) of Otef Aza.

A recent meta-analysis of 20 studies has demonstrated that, among residents of developed countries, mood and anxiety disorders are more prevalent among city dwellers than among rural residents (Peen, Schoevers, Beekman, & Dekker, 2010), perhaps due to the differential neural processing of stress (Lederbogen et al., 2011). Thus, to clearly ascertain the meaning of any differences observed between city and rural residents of these highly exposed communities, the selection of appropriate comparison groups is critical (cf. Wacholder, McLaughlin, Silverman, & Mandel, 1992). We identified two geographically, demographically and socio-economically similar neighboring communities that were not directly exposed to chronic attacks to serve as control groups. Specifically, we selected a matched non-exposed city (NEC), Ofakim, and a matched non-exposed rural community (NERC), Hevel Lachish. The city of Ofakim and the rural community region of Hevel Lachish, although adjacent to Sderot and Otef Aza, were out of range of the Qassam rockets at the time of the study.

The exposed city of Sderot and the non-exposed city of Ofakim are considered "development towns" and are strongly heterogeneous. Formed in the 1950's by North African immigrants and in the 1990's populated by former immigrants from the Soviet Union, both have a poor economic infra-structure with high levels of poverty, a high unemployment rate (20%) and a weak education system (Central Bureau of Statistics, 2011). The exposed rural community region of Otef Aza and the non-exposed rural community region of Hevel Lachish are comprised of kibbutzim (communal farming settlements) and moshavim (cooperative agricultural settlements) that originally began as agricultural utopian cooperatives combining different applications of socialism and Zionism. In contrast to the cities, these rural communities are characterized by strong solidarity between residents and a shared national and social ideology.

We hypothesized that the residents of the exposed city (EC, Sderot) and exposed rural community region (ERC, Otef Aza) would exhibit significantly greater vulnerability following the chronic attacks than the non-exposed control city (NEC, Ofakim) and non-exposed rural community regions (NERC, Hevel Lachish). In addition, among communities chronically exposed to rocket attacks, we predicted that residents of the more resourced rural community region (ERC, Otef Aza) would exhibit less symptomatology than residents of the less resourced city (EC, Sderot), despite similar

chronic exposure to the missiles. Finally, we hypothesized that individual-level factors identified in prior research on response to terrorism and political violence would also predict levels of PTS symptomatology and distress among these residents.

Method

Participants

Respondents resided in four regions: A high exposure city (EC, Sderot), a high exposure rural community region (ERC, Otef Aza), a non-exposed city (NEC, Ofakim), and a non-exposed rural community region (NERC, Hevel Lachish). By non-exposed we mean not having been targeted directly by rocket or mortar fire. At the time of the interviews, the EC of Sderot and the ERC of Otef Aza were being fired upon at the rate of 5–10 rockets daily. The city of Ofakim and the rural region of Hevel Lachish were specifically chosen as controls because of their proximity to each other and the fact that they were roughly identical to the highly exposed communities in size and socio-economic profile. Obviously, due to both the close proximity of these regions and cities (between 30 and 50 km) and media exposure, Ofakim and Hevel Lachish were indirectly exposed to the threat of shelling.

In July 2007, adults (≥18 years) from 905 households were approached for an interview; 740 (81.8%) agreed to participate. In the EC of Sderot, 285/333 participated (86.6% participation rate) and in the ERC of Otef Aza, 102/114 participated (89.5% participation rate). In the NEC of Ofakim, 251/333 participated (75.4% participation rate) and in the NERC of Hevel Lachish, 102/125 participated (81.6% participation rate).

Sampling

Samples were obtained by a major polling company using an in-region random digit dialing methodology using the national telephone directory that provides regional and community-specific dialing information. Apart from the EC of Sderot and NEC of Ofakim, 10 communities in the ERC of Otef Aza and 10 communities in the NERC of Hevel Lachish were randomly selected to be part of the subject pool.

Due to the difficulty of obtaining samples with equal gender and age compositions, poststratification weights were calculated by weighting for sex and age in each of the four study sites using 2006 census data (Central Bureau of Statistics, 2006, available upon request). Demographic characteristics of the samples and their relative sizes after weighting are presented in Table 1.

Data collection

Telephone interviews were carried out by experienced interviewers in Hebrew or Russian using a structured questionnaire. Three attempts were made to contact an adult at each telephone number. Participation was anonymous; oral informed consent was obtained at the beginning of the interview. The Helsinki Ethics Committee of the Lev Hasharon Mental Health Medical Center approved the design and procedures.

Instruments

The structured questionnaire consisted of items drawn from prior research (Bleich et al., 2003, 2006; Schlenger et al., 2002; Silver et al., 2002). A pilot study of 30 individuals was conducted; modifications made the questions more telephone-friendly. Interview completion time varied widely; in many instances, rocket alarms were sounded and interviews were curtailed so that participants could enter their shelter, or a "safe place," to be continued later. In the non-exposed city or rural community region, 88% of the interviews took 25–35 min to complete.

Table 1
Weighted demographic characteristics of the 4 communities.[a]

	Cities				Rural communities			
	Exposed		Non-exposed		Exposed		Non-exposed	
	Sderot $N = 276$		Ofakim $N = 323$		Otef Aza $N = 67$		Hevel Lachish $N = 73$	
	N	%	*N*	%	*N*	%	*N*	%
Gender								
Male	133	48.2	157	48.6	36	53.7	36	49.3
Female	143	51.8	166	51.4	31	46.3	37	50.7
Age								
18–29 years	84	30.3	98	30.3	19	27.9	17	23.3
30–44 years	77	27.8	86	26.6	17	25.0	20	27.4
45–54 years	54	19.5	58	18.0	13	19.1	11	15.1
55–95 years	62	22.4	81	25.1	19	27.9	25	34.4
Marital status								
Single	122	44.2	116	35.9	25	37.3	22	30.1
In couple	154	55.8	207	64.1	42	62.7	51	69.9
Education								
0–8 years	13	4.7	11	3.4	1	1.5	1	1.4
9–12 years	167	60.3	170	52.6	18	26.9	30	41.1
>12 years	97	35.0	142	44.0	48	71.6	42	57.5
Children								
With	174	63.0	215	66.6	50	74.6	53	72.6
Without	102	37.0	108	33.4	17	25.4	20	27.4
Parental status								
Not single parent	242	87.7	295	91.3	58	87.9	66	90.4
Single parent	34	12.3	28	8.7	8	12.1	7	9.6
Immigration status								
Local	167	60.9	236	72.8	67	100	72	98.6
Immigrated after 1990	109	39.5	88	27.2	0	0	1	1.4
Religion								
Religious	37	13.4	112	34.7	15	22.4	11	14.9
Traditional	101	35.5	106	32.8	6	8.9	10	13.5
Secular	139	50.2	105	32.5	46	68.7	53	71.6
Income								
Lower than average	139	50.4	181	56.0	28	41.8	33	45.2
Average	62	22.5	79	24.5	28	41.8	21	28.8
Higher than average	75	27.2	63	19.5	11	16.4	19	26.0
Time in location								
In years *M* (*SD*)	21.8 (13.6)		20.1 (13.4)		27.5 (16.5)		27.0 (18.2)	

[a] The unweighted N for the EC of Sderot is 285, for the NEC of Ofakim is 251, for the ERC of Otef Aza is 102 and for the NERC of Hevel Lachish is 102. Small differences in the number of subjects in cells are due to weighting.

Demographic data collected included gender, age, marital status, education (0–8 years, 9–12 years, >12 years), parental status, presence of children, immigration status (immigrated after 1990 or local), religion (atheist, traditionalist or religious), income (measured on a 5-item Likert scale from (1) much lower than 9500 IS (the average Israeli family income) to (5) much higher than 9500 IS), and length of time resided in location.

Exposure to rocket fire was assessed with eight questions. Three Guttman severity scales were calculated 1) *Personal exposure* [(0) no exposure, (1) heard or saw a rocket fall, (2) a rocket fell close to me, (3) my house was hit, (4) I was physically wounded]; 2) *Near miss* [(0) no near miss, (1) someone I knew was physically injured, (2) family member or close relative was physically injured]; 3) *Loss of close other* [(0) no loss, (1) acquaintance was killed, (2) family member or close relative was killed].

Economic Loss was measured by self-report of property or income loss as a result of the "security situation" (yes/no).

Major lifetime traumatic events were assessed with a modified version of the Traumatic Event Questionnaire (Vrana & Lauterbach, 1994). Respondents reported whether they had ever experienced each of seven traumatic events unrelated to the chronic exposure to

rocket attacks, such as death of a close relative/friend or severe road accident.

Perceived threat (Bleich et al., 2003, 2006) was measured with two items that assessed respondents' sense of threat to themselves and their relatives, rated on 5-point Likert scales from 'not at all' (0) to 'very much' (4) (Cronbach's $\alpha = .87$).

Functioning was assessed in six domains (vocational, educational, spousal, parental, social, and intimacy) and was measured using 5-point Likert scales from (0) inadequate to (4) perfectly adequate. The scale was developed for the current study. The total score was the mean of all relevant items (Cronbach's $\alpha = .88$).

Posttraumatic stress (PTS) symptomatology was assessed with the PTSD Checklist (PCL, Weathers, Litz, Herman, Huska, & Keane, 1993), a well-validated 17-item measure of intrusion, avoidance, and arousal symptoms using 5-point Likert scales from (1) not at all bothered to (5) extremely bothered. Reliability in the present study was excellent (Cronbach's $\alpha = .94$). Due to the chronic nature of the stressor, individuals were asked to respond to items in relation to "the security situation" and to report on symptoms experienced during the previous month. A continuous measure of PTS symptoms was computed by summing scores across all items. As suggested by the original authors, a score of three (moderately) or greater on each item was classified as a positive symptom, then following DSM-IV (American Psychiatric Association (APA), 1994) diagnostic rules, a diagnosis of probable posttraumatic stress disorder (PTSD) was derived by using DSM-IV PTSD diagnostic criteria B, C, and D (i.e., one or more reexperiencing symptom, three or more avoidance symptoms, and two or more arousal symptoms) (APA, 1994) and including functional impairment in at least one domain [rated as inadequate (1) or quite inadequate (2)].

Global Distress was measured with the 18-item Brief Symptom Inventory (BSI-18; Derogatis, 2001). Respondents reported the degree to which they were distressed by symptoms/problems experienced in the past month and rated them on 5-point scales [(0) "not at all" to (4) "extremely"]. Cronbach's α for the somatization, anxiety, and depression subscales and the total score were .90, .84, .92, and .95, respectively.

Coping was assessed with the Brief COPE (Carver, 1997), a measure of 14 different coping strategies (two items per strategy). Participants indicated on a 4-point scale (1 = "I didn't do this at all", 4 = "I did this a lot") the frequency with which they used each strategy to cope with stressful situations such as the security threat.

The Crisis Support Scale (CSS, Joseph, Yule, Williams, & Hodgkinson, 1994) is a 7-item scale measuring receipt of different aspects of social support after a traumatic event using 5-point scales ranging from (1) never to (5) very often. (Cronbach's $\alpha = .69$).

Optimism was assessed by two items adapted from the Future Orientation Scale (Saigh, 1997). Respondents reported their current optimism about their personal future and about the future of the State of Israel on a 5-point Likert scale. Both separate and composite scores were examined (Cronbach's $\alpha = .67$).

Sense of Belonging to the Community was assessed with four items such as 'I feel it is important I live in this country' and 'I feel part of this community/town.' Each item was answered on a 5-point Likert scale from (0) not at all to (4) very much so and averaged (Cronbach's $\alpha = .60$). *Commitment to the Community* was assessed by asking individuals whether they would leave town if they had the possibility of doing so (yes/no). Both measures were developed for the purpose of this study.

Confidence in the Government Leaders was assessed using a 5-point Likert scale from not at all (0) to very much (4). *Confidence in the Army* (and in particular that the Army would handle the security situation well) was answered on a 5-point Likert scale from not at all (0) to very much (4). Both were developed for the purposes of this study.

Health Care Utilization was assessed in several ways. Frequency of use of medical services, frequency of medication usage for physical ailments (blood pressure, headaches, or stomachaches), and frequency of medication usage for psychological symptoms (to calm down or sleep) were recorded and categorized (none, once or twice in prior month, three or more times in prior month). In Israel, every citizen is registered at a Health Maintenance Organization providing medical services that are widely available both in cities as well as in rural communities. All cities and rural communities under study had an on-site clinic as well as a physician and nurse available 24-h daily. Respondents were also asked whether they used a telephone hotline to cope with psychological distress (yes/no) and whether they received any kind of professional counseling during the past month (yes/no).

Analytic strategy

Statistical analyses were conducted with SPSS, Version 15.5. Missing values were minimal (less than 1% for any variable except religion [1.8%], income [7.7%], economic loss [1.5%], confidence in government leaders [2.5%] and confidence in the army [3.1%]), and were replaced by the mean score of the variable for the sample of each of the four regions. Analyses were also performed without the replacement of missing values; no significant differences were observed.

Analyses were designed to assess (1) levels of PTS symptoms, global distress, functioning, perceptions of threat, and health care utilization in exposed and non-exposed cities and rural communities; (2) how residents of cities and rural communities differed on community and individual-level variables, and (3) the predictors of PTS symptoms and global distress. Multivariate Analysis of Variance (MANOVA) and chi-square tests were used to examine differences in outcome variables between exposed and non-exposed cities and rural communities and a logistic regression was used to examine community differences between cities and rural communities. Finally, stepwise linear regression analyses were used to predict PTS symptomatology and global distress. Seven blocks of variables were tested for inclusion in the analyses: (1) demographic variables (gender, age, education, immigration status, religion, marital status, single parent status); (2) location and exposure factors (exposed vs. non-exposed location, city vs. rural community, interaction of location and exposure); (3) traumatic life event history; (4) objective exposure variables (personal exposure, near miss, loss); (5) community variables (commitment to community, belongingness, belief in government leaders and in the army); (6) economic loss due to the security situation; and (7) coping strategies, including optimism. Barring evidence of confounding, and to provide the most parsimonious model, variables that did not reach significance within blocks ($p > .05$) were not included in the final models. All results are presented with the weighted samples.

Results

Demographic comparisons within rural communities and cities

Information provided by the municipalities of the EC of Sderot and NEC of Ofakim and by local key informants within the rural communities (ERC and NERC) suggested that the cities and rural communities were roughly matched on income, education, number of children and religiosity of residents. Univariate analyses compared demographic characteristics between samples obtained from the exposed and non-exposed cities and between the exposed and non-exposed rural communities. Few differences were found between the city residents except more single individuals (44.2% vs. 35.9%; $\chi^2 = 4.3$; $p = .04$), less religious individuals (49.6%, vs. 67.5%;

$\chi^2 = 19.6$; $p < .001$) and more immigrants (39.5% vs. 27.2%; $\chi^2 = 10.3$; $p < .001$) resided in the EC of Sderot compared to the NEC of Ofakim. There were no demographic differences between the two rural community samples.

Exposure to rocket fire and economic loss

Exposure rates are presented in Table 2. The EC of Sderot had intense missile exposure: 97.8% of residents had been in close proximity to a rocket and 52.7% had their house hit (directly or by shrapnel), 72.1% had a family member injured or knew someone wounded, 48.4% knew someone killed by rockets, and 4.7% were wounded themselves. In the ERC of Otef Aza, 95.5% had been in close proximity to a rocket and 32.8% had their house hit, 59.7% had a family member injured or knew someone wounded, 28.4% knew someone killed by rockets, and no one was personally wounded. Residents of the EC of Sderot were found to have more personal exposure ($t_{341} = 5.03$; $p < .001$), more near miss exposure ($t_{341} = p < .008$) and more loss of close others ($t_{341} = 3.1$; $p < .002$) compared to the ERC of Otef Aza. No one had been directly exposed in the NEC of Ofakim nor the NERC of Hevel Lachish.

Economic loss as a result of the security threat was reported by 59.1% ($n = 168$) in the EC of Sderot and 29.9% ($n = 20$) in the ERC of Otef Aza; 46.2% ($n = 148$) reported economic loss in the NEC of Ofakim (46.2%) and 20.8% ($n = 15$) in the NERC of Hevel Lachish.

Mental health outcomes and health care utilization

Weighted prevalence of PTS symptomatology, global distress, functioning, perceived threat, health care utilization, and medication use across the four samples is presented in the first four columns of Table 3. Results regarding PTSD clusters and medication intake for physical conditions, and anxiety and sleep problems, are presented in the text (weighted percentages reported).

EC of Sderot vs. NEC of Ofakim

All rates on outcome variables in the EC of Sderot were significantly higher than rates reported in the NEC of Ofakim. Rates of probable PTSD were significant higher in the EC of Sderot (26.4%) than the NEC of Ofakim (5.6%; $\chi^2 = 50.3$; df = 1; $p = .001$). Compared to residents of the NEC of Ofakim, residents from the EC of Sderot reported more reexperiencing (EC: 84.8%; NEC: 59.1%; $\chi^2 = 48.2$, df = 1, $p < .001$), avoidance (EC:44.9%; NEC: 20.1%; $\chi^2 = 41.5$; df = 1, $p < .001$) and hyperarousal (EC: 76.4%; NEC: 33.7%; $\chi^2 = 108.2$, df = 1, $p < .001$) symptoms, higher PTS scores ($t(598) = 12.6$, $p < .001$), and more global distress (total distress score: $t(598) = 9.6$; $p < .001$) on the BSI-18, as well as its subscales. The residents from the NEC of Ofakim functioned significantly better than residents of the EC of Sderot, $t(598) = 6.4$, $p < .001$.

Compared to the residents of the NEC of Ofakim, residents of the EC of Sderot went to a general practitioner more often (EC: no visits 61.1%, 1 or 2 visits 21.8%, >2 visits 17.1%; NEC: no visits 80.8%, 1 or 2 visits 15.5%, >2 visits 3.7%; $\chi^2 = 38.5$; df = 2; $p = .001$), used more medication for physical ailments (EC: no medications 61.1%, 1 or 2 uses 11.6%, >2 uses 27.3%; NEC: no medications 77.0%, 1 or 2 uses 12.7%, >2 uses 10.3%; $\chi^2 = 28.3$; df = 2; $p = .001$) and anxiety and sleep (EC: no medications 68.1%, 1 or 2 uses 9.4%, >2 uses 22.5%; NEC: no medications 84.2%, 1 or 2 uses 5.9%, >2 uses 9.9%; $\chi^2 = 21.6$; df = 2; $p = .001$), phoned hotlines more often (used hotline at least once, EC: 8.4%; NEC: 2.5%; $\chi^2 = 10.4$; df = 1; $p = .001$), and had more counseling (had counseling at least once, EC: 13.4%; NEC: 4.3%; $\chi^2 = 15.8$; df = 1; $p = .001$).

ERC of Otef Aza vs. NERC of Hevel Lachish

Compared to residents of the NERC of Hevel Lachish, residents of the ERC of Otef Aza reported significantly more anxiety (ERC: $M = 3.88$, $SD = 5.1$; NERC: $M = 1.84$, $SD = 3.1$; $t(137) = 3.0$, $p < .003$) and global distress ($t(137) = 1.9$, $p < .05$) as measured on the BSI-18. Residents of the ERC of Otef Aza also received significantly more counseling services (had counseling at least once, ERC: 7.5%; NERC: 0%; $\chi^2 = 5.5$; df = 1; Fisher exact test $p = .03$) compared to residents of the NERC of Hevel Lachish. No other comparisons reached significance.

EC of Sderot vs. ERC of Otef Aza

Compared to residents of the EC of Sderot (26.4%), rates of probable PTSD were significantly lower in the ERC of Otef Aza (1.5%; $\chi^2 = 19.5$, df = 1, Fisher exact test $p < .001$), and the residents of the ERC of Otef Aza reported less PTS ($t(341) = 8.2$, $p < .001$), global distress ($t(341) = 7.2$, $p < .001$) on the BSI-18, as well as its subscales, and higher functioning scores, $t(341) = 5.1$, $p < .001$.

The residents of the EC of Sderot also went to a general practitioner more often than residents of the ERC of Otef Aza (EC: no visits 61.1%, 1 or 2 visits 21.8%, >2 visits 17.1%; ERC: no visits 95.5%, 1 or 2 visits 4.5%, >2 visits 0%; $\chi^2 = 29.7$; df = 2; Fisher exact test $p = .001$), used more medication for physical ailments (EC: no medications 61.1%, 1 or 2 uses 11.6%, >2 uses 27.3%; ERC: no medications 88.1%, 1 or 2 uses 4.5%, >2 uses 7.5%; $\chi^2 = 17.6$; df = 2; Fisher exact test $p = .001$) and anxiety and sleep (EC: no medications 68.1%, 1 or 2 uses 9.4%, >2 uses 22.5%; ERC: no medications 92.5%, 1 or 2 uses 6.0%, >2 uses 1.5%; $\chi^2 = 18.1$; df = 2; Fisher exact test $p = .001$), phoned hotlines more often (used hotline at least once, EC: 8.4%; ERC: 1.5%; $\chi^2 = 3.9$; df = 1; Fisher exact test $p = .001$), but did not receive less counseling services (had counseling at least once, EC: 13.4%; ERC: 7.5%; $\chi^2 = 1.7$; df = 1; ns).

Table 2
Objective exposure to rocket fire (weighted).

Exposure categories	Exposed city		Exposed rural community	
	Sderot $N = 276$		Otef Aza $N = 67$	
	N	%	*N*	%
Personal exposure				
No exposure	6	2.2	3	4.5
Heard or saw a rocket fall	9	3.3	14	20.9
Rocket fell close to me	102	37.1	28	41.8
My house was hit	145	52.7	22	32.8
I was wounded	13	4.7	0	0
Near miss				
No exposure	77	27.9	27	40.3
Knew someone wounded	158	57.2	37	55.2
Family injured	41	14.9	3	4.5
Loss of close other				
No exposure	142	51.6	48	71.6
Acquaintance killed	125	45.5	19	28.4
Family member killed	8	2.9	0	0

Impact of exposure and location on mental health outcomes and health care utilization

We examined the main effects of exposure status (exposed vs. non-exposed) and location (city vs. rural community), as well as their interaction, on PTS symptomatology, global distress, functioning, perceived threat, health care utilization, and medication use (see Table 3). All outcomes differed significantly by both exposure status and location, and exposure status and location interacted significantly on all outcomes. Graphing the means suggests that rates of PTS symptomatology, distress, functional impairment and health care utilization in Sderot were substantially higher than the other three communities (see Fig. 1). Perceived threat and medication use show the same pattern (not graphed).

Table 3
Means (standard deviations) and *F* values for PTS symptoms, global distress (BSI-18), functioning, perceived threat and health care utilization and number and percentage of individuals with probable PTSD.

Variable (range)	Exposed		Non-exposed		*F* value		
	Sderot (city)	Otef Aza (community)	Ofakim (city)	Hevel Lachish (community)	Exposure main effect	Location main effect	Exposure × location interaction
PTS symptoms (17–85)	46.56 (17.32)	30.66 (13.46)	28.36 (11.68)	25.32 (9.15)	62.5***	68.8***	19.3***
Global distress (0–72)	23.78 (18.55)	10.50 (14.33)	6.89 (9.89)	4.28 (7.43)	38.6***	63.8***	12.7***
Functioning (0–4)	2.7 (.9)	3.3 (.7)	3.2 (.8)	3.4 (.6)	15.3***	19.5***	6.4**
Perceived threat (0–8)	6.4 (2.0)	3.5 (2.5)	2.7 (2.4)	2.1 (2.3)	146.5***	67.8***	28.9***
Medical visits (0–2)	.9 (1.3)	.1 (.2)	.4 (.8)	.1 (.5)	6.7**	36.0***	11.8***
Medication intake (0–2)	1.3 (1.7)	.2 (.8)	.6 (1.1)	.4 (1.1)	4.5*	23.5***	13.2***
Probable PTSD *N* (%)	73 (26.4)	18 (5.6)	1 (1.5)	0 (0)	$\chi^2(3) = 81.17^{***}$		

Note: $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Differences between cities and rural communities

To examine the differences between cities and rural communities, we compared all independent variables using univariate analyses. Variables that were significant ($p < .05$) were entered into a logistic regression with the dummy variable "cities vs. communities" serving as the dependent variable. Compared to the rural communities, the cities were comprised of more immigrants, traditionally religious and orthodox religious individuals, and education levels were lower. Residents in the cities reported greater economic loss and greater lack of commitment to their community than rural residents, and residents of the rural communities reported greater confidence in the army and in the government. Finally, compared to residents in the cities, there was more active coping and acceptance and less use of religion in the rural communities. Final results are presented in Table 4.

Predictors of PTS symptoms and global distress

Univariate analyses were used to identify significant predictors of PTS symptoms and global distress among the entire sample. Two stepwise linear regressions were performed; only significant variables remained in subsequent steps and the models are presented in Tables 5 and 6. For the final model predicting PTS symptom severity, 54% of the variance is explained; for the final model predicting global distress, 52% of the variance is explained.

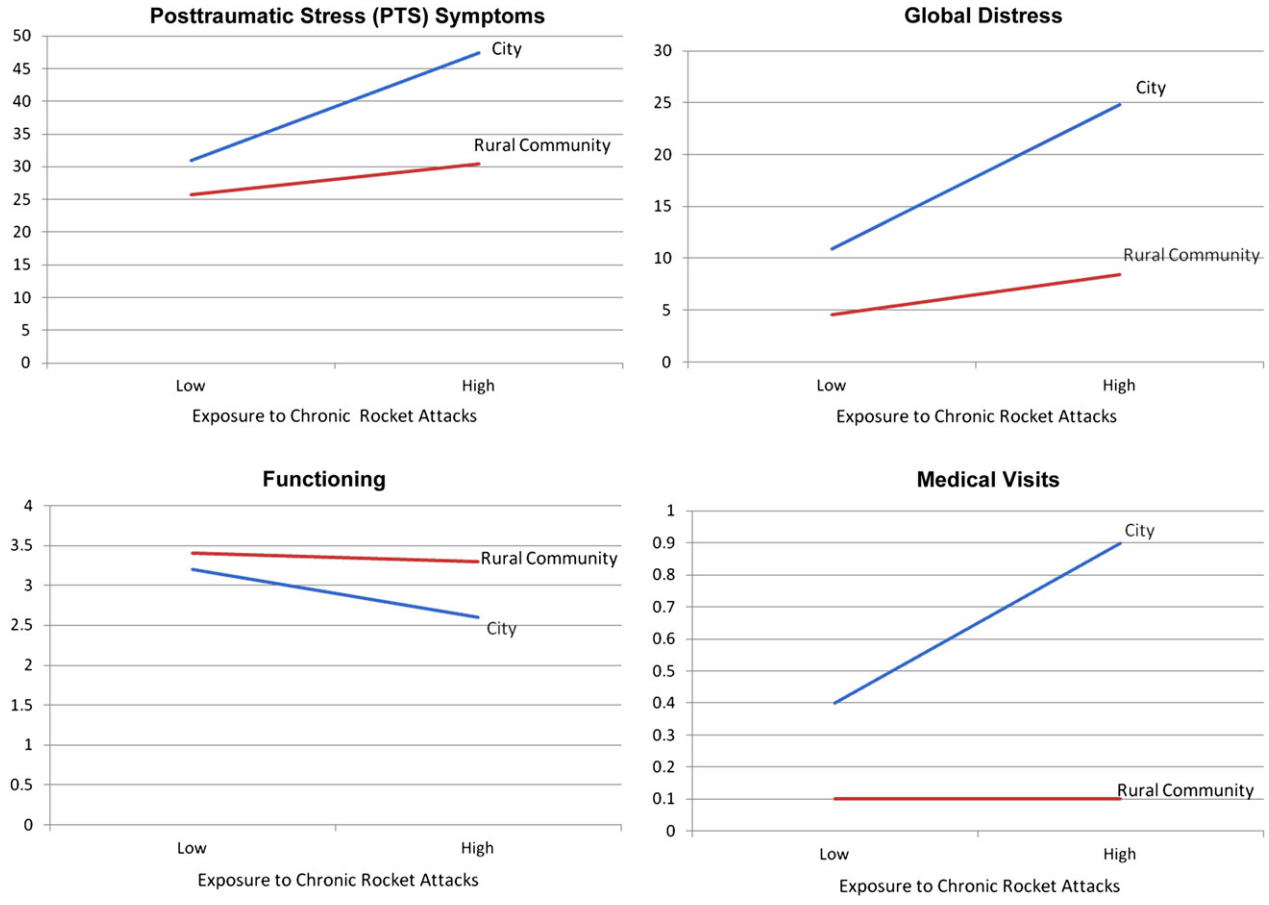

Fig. 1. Outcome measures among exposed and non-exposed city and rural community residents.

Discussion

Most of the residents of the highly exposed city of Sderot and the highly exposed rural community of Otef Aza had been exposed to chronic and intense rocket attacks for many years. In the EC of Sderot, more than one half, and in the ERC of Otef Aza, about one third, of the residences had been hit by rockets, mortar fire or shrapnel. More than 70% of the EC Sderot residents and 60% of the ERC inhabitants knew people who were wounded during the attacks. Only 2% of the residents of the EC of Sderot and less than 5% of residents of the ERC of Otef Aza reported no personal exposure to rocket fire. Nevertheless, the low level of symptoms evident among residents of the exposed rural community region of Otef Aza is striking: only one person reported symptoms consistent with probable PTSD; over 98% of the sample did not. The residents of the ERC of Otef Aza were *not* significantly more impacted psychologically than their non-exposed matched counterparts in the rural community region of Hevel Lachish.

In contrast, rates of symptomatology, distress, perceived threat (both to oneself as well as to family), functioning and health care utilization in the EC of Sderot were substantially higher than the other three communities. In Sderot, over a quarter of the sample reported symptoms consistent with probable PTSD, and reexperiencing and arousal symptoms were extremely high, reported by over three-quarters of the sample. The high exposure rates and daily stress, including the repeated race for shelter, appear to have taken their toll. Indeed, the high level of population heterogeneity, which includes various religious groups and nationalities, with most of the population having immigrated to Israel from North Africa or the Asian regions of the former Soviet Union, was associated with increased vulnerability among city residents. In addition, the resources of the community and its residents have been seriously strained, with more than 50% of the residents reporting a lower than average income, more than 65% having no higher education, and significant levels of economic loss during this period. The ongoing character of the exposure may have exacerbated stressful social conditions and daily hassles (Miller & Rasmussen, 2010) on the one hand, as well as hampered recovery (Rodin & van Ommeren, 2009) on the other.

The picture looked very different in the rural community region that was exposed to chronic rocket attacks. How might we explain the low level of vulnerability of their residents? Our data provide us with several hints. Among community-related variables, the residents of the rural communities were less likely to be immigrants, and they reported higher levels of community commitment and feeling that they were an integral part of their community. They reported having a strong social network for both instrumental and emotional support. Finally, these residents indicated greater confidence in the army and in the national leadership of the country. It is likely that increased community solidarity and a shared worldview, as well as social identification, served a protective function for these individuals, despite the chronic attacks to which they were exposed (Dekel & Nuttman-Shwartz, 2009; Kaplan et al., 2005; Muldoon & Downes, 2007; Somer et al., 2008). Our results are consistent with Moscardino et al. (2010), who found that a sense of community and a collectivistic worldview moderated the social support necessary for coping with trauma. In addition, each rural community has a local officer who is responsible for the security of the inhabitants and serves as the liaison with the army and an elected committee handling community issues. These officers are responsible for the state of the local shelters, which is in stark contrast to the situation in cities, where shelters are not always clean, lack water and electricity, and lack liaison personnel for less mobile populations.

Our analyses identified a number of variables associated with the presence of PTS symptomatology and global distress among individual residents, including being female, a single parent, older, less educated, experiencing economic loss, a history of life traumas, and lacking social support or optimism, among other factors. Individuals at risk for ongoing symptomatology and distress appear to lack the social and economic resources to withstand chronic exposure to political violence (Hobfoll, Tracy, & Galea, 2006). In accordance with previous studies (Bleich et al., 2003; Silver et al., 2002), we also found that a tendency to cope passively either by denial, behavioral disengagement or acceptance was associated with psychopathology, while the use of humor and positive reframing was associated with less symptom presentation. Venting and the use of religion were also associated with negative outcomes in response to this chronic stress. In addition, exposure to the war-related attacks may have been more salient in dense city environments. In such communities, more people may be impacted by the consequences of the violence, including economic loss or strain, both directly and indirectly. Interestingly, our results also add to our understanding of why proximity to a potentially traumatic situation is only a risk factor in some (Brewin et al., 2000), but not all (Bleich et al., 2003, 2006; Silver et al., 2002), studies on trauma. Exposure may impact specific individuals and communities that are especially vulnerable as a result of personal factors or resource deficiencies.

Limitations

The present study is the first to compare rates and predictors of mental health outcomes among four different communities – two cities and two rural communities, two directly and two indirectly exposed to potentially traumatic conditions. Nonetheless, we must

Table 4
Logistic regression with cities vs. rural communities as dependent variable.

	Cities $N = 599$		Rural communities $N = 140$		B	S.E.	Exp(B)	95% CI	
	N	%	N	%				Lower	Upper
Being an immigrant***	197	32.9	1	.7	5.18	1.01	.01	.001	.04
Traditional religious***	207	34.6	16	11.4	1.89	.42	.15	.07	.35
Orthodox religious***	149	24.0	25	18.0	1.63	.49	.197	.08	.51
Education level*** M (SD)	12.9	(2.5)	14.2	(2.5)	−1.05	.30	2.85	1.60	5.08
Commitment to community**	244	40.2	110	78.4	−.92	.32	.40	.21	.75
Confidence in government*** M (SD)	1.0	(1.3)	2.42	(1.3)	−.86	.12	2.35	1.85	2.99
Confidence in the army* M (SD)	1.9	(1.5)	2.3	(1.2)	−.25	.11	.78	.63	.97
Community belonging* M (SD)	2.8	(1.3)	3.4	(.8)	−.30	.13	.74	.58	.95
Economic loss***	316	53.0	35	25.2	.81	.23	.44	.28	.70
Active coping*** M (SD)	5.2	(2.0)	5.6	(2.0)	.27	.09	1.32	1.11	1.55
Coping by acceptance** M (SD)	6.5	(1.8)	7.2	(1.2)	.26	.10	1.30	1.06	1.59
Use of religion*** M (SD)	4.7	(2.5)	3.4	(2.1)	−.27	.09	.77	.65	.90

Note: $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 5
Regression model for posttraumatic stress symptomatology (PCL).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	b(SE)	*b*(SE)	*b*(SE)	*b*(SE)	*b*(SE)	*b*(SE)	*b*(SE)
Demographics							
Gender	−6.74(1.2)***	−6.3(1.1)***	−6.58(1.1)***	−6.56(1.1)***	−6.16(1.0)***	−5.96(.9)***	−4.33(.9)***
Age	.15(.0)***	.16(.0)***	.14(.0)***	.14(.0)***	.14(.0)***	.17(.0)***	.20(.0)***
Education	−1.19(.2)***	−.69(.2)***	−.67(.2)***	−.68(.2)***	−.67(.2)***	−.55(.2)**	−.38(.2)*
Exposure and location							
Exposed vs. non-exposed		15.32(1.2)***	15.64(1.2)***	7.00(2.8)**	7.95(2.66)**	6.95(2.5)**	6.24(2.33)**
Cities vs. rural communities		5.03(1.9)**	5.17(1.8)**	5.12(1.8)	2.47(1.8)**	.84(1.6)	1.15(1.6)
Exposure × location		11.75(2.7)***	11.99(2.7)***	10.24(2.7)***	10.16(2.5)***	9.16(2.4)***	6.55(2.3)**
Major life events			5.14(1.3)***	5.09(1.3)***	4.17(1.2)***	3.30(1.1)**	2.54(1.1)*
Personal exposure				3.40(1.0)***	2.51(.9)**	2.15(.9)*	2.07(.8)**
Community variables							
Commitment to community					−4.24(.6)***	−4.55(1.0)***	−2.48(1.0)**
Crisis social support					−4.92(1.1)***	−3.15(.6)***	−1.72(.5)***
Economic loss						5.85(.6)***	4.86(.6)***
Coping							
Optimism							−.90(.4)**
Denial							1.14(.3)***
Behavioral disengagement							1.82(.3)***
Venting							.67(.3)**
Use of religion							.49(.2)**
Use of humor							−.44(.2)*

The following variables were tested for inclusion in the model (1) demographic variables (gender, age, education, immigration status, religion, marital status, single parent status); (2) location and exposure factors (exposed vs. non-exposed location, city vs. rural community, interaction of location and exposure); (3) other major negative life events; (4) objective exposure variables (personal exposure, near miss, loss); (5) community variables (commitment to community, belongingness, belief in leaders and in the army); (6) economic loss due to the security situation; and (7) coping strategies including optimism. Any variables not listed in the table were not significant in the initial screening blocks. For the gender variable, female was coded 0, male 1; for the exposure variable, non-exposed locations were coded 0, exposed locations 1; for the location variable, rural regions were coded 0 and cities 1. Adjusted cumulative R^2 change for the final model was .54.
*$p < .05$; **$p < .01$; ***$p < .001$.

Table 6
Regression model for global distress (BSI-18).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	b(SE)	*b*(SE)	*b*(SE)	*b*(SE)	*b*(SE)	*b*(SE)
Demographics						
Gender	−4.84(1.2)***	−4.47(1.1)***	−4.76(1.1)***	−4.56(1.1)***	−4.52(1.0)***	−2.73(1.0)**
Age	.09(.0)*	.11(.0)*	.09(.0)*	.10(.0)**	.13(.0)***	.14(.0)***
Education	−1.19(.3)***	−.73(.2)**	−.69(.2)***	−.66(.2)**	−.56(.2)**	−.37(.2)*
Single parent	10.89(2.1)***	10.28(1.9)***	10.18(1.9)***	7.59(1.8)***	6.28(1.7)***	5.12(1.6)***
Exposure and location						
Exposed vs. non-exposed		12.28(1.2)***	12.59(1.2)***	11.47(1.19)***	9.82(1.2)***	8.81(1.1)***
Cities vs. rural communities		5.92(2.0)**	6.06(1.9)**	4.84(1.9)**	3.37(1.9)	2.30(1.8)
Exposure × location		9.41(2.85)***	9.71(2.8)***	9.25(2.7)***	8.33(2.5)***	5.91(2.4)**
Major life events			4.87(1.4)***	4.41(1.3)***	3.63(1.2)**	3.30(1.1)**
Community variables						
Crisis social support				−4.52(.6)***	−3.62(.6)***	−1.97(.6)**
Commitment to community				−4.93(1.2)***	−4.74(1.1)***	−2.26(1.1)*
Confidence in government				−1.31(.4)**	−1.32(.4)***	−1.01(.4)**
Belonging				−.95(.4)*	−.70(.4)	−.19(.4)
Economic loss					5.25(.7)***	4.34(.6)***
Coping						
Optimism						−1.60(.4)***
Denial						.73(.3)*
Behavioral disengagement						1.64(.3)***
Venting						1.47(.3)***
Use of humor						−.57(.2)**
Use of religion						.75(.2)***
Positive reframing						−.51(.3)*
Acceptance						−.98(.3)***

The following variables were tested for inclusion in the model (1) demographic variables (gender, age, education, immigration status, religion, marital status, single parent status); (2) location and exposure factors (exposed vs. non-exposed location, city vs. rural community, interaction of location and exposure); (3) other major negative life events; (4) objective exposure variables (personal exposure, near miss, loss); (5) community variables (commitment to community, belongingness, belief in leaders and in the army); (6) economic loss due to the security situation; and (7) coping strategies including optimism. Any variables not listed in the table were not significant in the initial screening blocks. In addition, the original fourth stage (adding the objective exposure variables) was removed as no variable was significant. For the gender variable, female was coded 0, male 1; for the exposure variable, non-exposed locations were coded 0, exposed locations 1; for the location variable, rural regions were coded 0 and cities 1. Adjusted cumulative R^2 change for the final model was .52.
*$p < .05$; **$p < .01$; ***$p < .001$.

acknowledge some limitations of our investigation. First, although large scale telephone surveys are efficient, responses on symptom checklists are not equal to conducting clinical interviews, and it is difficult to distinguish between clinical PTSD and non-pathological distress reactions. (Of course, future research might also investigate whether the high arousal that was assessed in our PTS measure might actually be a healthy reaction to the chronic security situation.) Moreover, because many of our participants were living in a war zone during data collection, we were able to sample individuals who might otherwise be missed should an interviewer need to go to their home or other potentially unsafe meeting space. Second, since we did not find adequate preexisting scales to measure several of our constructs, we necessarily used measures developed for this particular investigation. A third limitation may lie in our choice of surveyed populations. For example, although the cities and rural communities were roughly identical on the demographic characteristics we measured, there are likely to be unmeasured differences in the composition of the population of these towns and settlements. Fourth, the present study involved a single interview conducted during a particular snapshot in time; longitudinal research across the period of chronic exposure to rocket fire might have enabled us to see changes in symptomatology over time. Finally, many residents have left the EC of Sderot in the ensuring years of violence. Thus, it is possible that many of the most vulnerable or some of those with the fewest resources remained by the time our interviews were conducted. Subsequent research efforts should examine this factor as a possible moderator when measuring the mental and physical health impact of chronic political violence.

Clinical and policy implications

Given the intense and chronic exposure to trauma among so many residents in the EC of Sderot and the ERC of Otef Aza and the widespread presence of reexperiencing and arousal symptoms, it seems prudent to take measures to prevent the development of PTS symptomatology. A preventive approach toward war-exposed communities should focus on vulnerable groups – such as disadvantaged populations who lack economic and social support – by developing educationally-appropriate and culturally-sensitive interventions (Berger & Gelkopf, 2009; Gelkopf & Berger, 2009; Silove & Zwi, 2005; Summerfield, 1999). A preparedness program in political conflict regions aimed at enhancing residents' resiliency could also focus on strengthening community solidarity and social identification by encouraging volunteers to provide support for at-risk groups (e.g., immigrants, single parents, the elderly), or launching public campaigns aimed at promoting community and belongingness-related values. Authorities should invest in being more accessible and transparent to their constituencies, explaining the rationale for their policies and being 'closer' to the people.

Conclusions

Unfortunately, political violence is an all-too-common experience across the world. Many of these political conflicts are chronic and may be traumatic, with the potential for long-term negative health effects (Holman & Silver, 2011). Nonetheless, hopelessness and psychopathology are not inevitable. Over the past few decades, a great deal of research has focused on the factors that exacerbate distress, functional impairment and health care utilization following chronic stress. This study is among the growing body of research findings that identifies factors that protect individuals and communities from these deleterious consequences. It is hoped that our effort can serve to assist in the design of individual and community-wide interventions and government policies that foster strength, rather than weakness and victimization, in the face of chronic political violence.

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