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Mental health medication and service utilisation before, during and after war: a nested case–control study of exposed and non-exposed general population, 'at risk', and severely mentally ill cohorts

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Aims. To examine changes in service utilisation before, during and after the 2006 Lebanon War – a 34-day military conflict in northern Israel and Lebanon – among three groups: general population, people 'at risk' for depression or anxiety and severely mentally ill individuals. Given that exposure to traumatic events is a pathogenic factor known to cause and exacerbate psychiatric distress and disorder, we hypothesised that healthcare service utilisation would increase in populations exposed to war, especially among more vulnerable populations such as those with mental illness.

Method. A nested case–control design was used to examine changes in health care utilisation and use of psychiatric medication as recorded by the databases of Maccabi Healthcare Services (MHS), one of Israel's largest health maintenance organisations (HMOs). Purchases of benzodiazepines, antidepressants and antipsychotic medications were identified from all the medications purchased in pharmacies by MHS members during 2006. Drug consumption data were expressed as defined daily doses (DDDs), summing all DDDs per person per month. Similarly, number of visits to general practitioners (GPs), psychiatrists and Emergency Rooms (ERs) were summed per person per month. Three-way repeated measures ANOVA was used, including the variables time (12 months), region (north/other) and study group.

Results. During the war there was a decline in GP visits among people from the general population and people 'at risk' for depression/anxiety who resided in northern Israel that was not paralleled among controls. Similarly, in all three study groups, there was a decline in the number of psychiatrist visits during the war among people from northern Israel which did not occur to the same extent in the control group. There were no changes in ER visits or use of psychiatric medication that could be attributed to the war.

Conclusions. There is less utilisation of community services at times of war among exposed populations, and there is neither evident compensation in use of emergency services, nor any compensation after the war. This may suggest that if there is an efficient medical and mental health infrastructure, people with or without psychiatric risk factors can tolerate a few weeks of a mass stress event, with no need to expand medical service utilisation. However, service utilisation at times of war may be confounded by other variables and may not serve as a direct measure of increased stress.

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Key words: Health care utilisation, psychiatric medication, traumatic events.

Introduction

It has been widely and robustly observed that large-scale traumatic events have an important mental health impact in the forms of post-traumatic stress disorder (PTSD; Neria *et al.* 2008), depression (Kilpatrick & Acierno, 2003), anxiety (Neria *et al.* 2010), as well as somatisation and physical illness (Gupta, 2013). Paradoxically, at the overall population level, large-scale studies assessing primary care and psychiatric visits, as well as psychiatric medication use, do not show an expected pattern of utilisation following traumatic events. For example, research after major traumatic events present either no significant increment of psychotropic drug use (Druss & Marcus, 2004; Boscarino *et al.* 2005) a minimal increment (McCarter & Goldman, 2002) or even less use compared with a non-exposed control group (Goldberg *et al.* 2013). In addition, a small increase of anxiolytic prescription by non-psychiatrists was observed after 9/11 (Druss & Marcus, 2004), as well as a small

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increment in visits to primary care physicians (Rosenheck & Fontana, 2003; Levav *et al.* 2006), suggesting that individuals might seek help in non-psychiatric settings. Still, other studies did not show this pattern (Rosenheck & Fontana, 2003; Goldberg *et al.* 2013).

The slight increase in treatment seeking after a mass traumatic event observed at times in the general population might be due to specific 'at risk' populations, such as older populations who may have previously been exposed to severe traumas (e.g., the Holocaust (Levav *et al.* 2006)), or individuals with severe mental illness (SMI). Indeed research has robustly shown individuals with severe mental problems to be especially prone to difficulty in managing high or even moderate levels of stress (Lira & Jutta, 2012; Palmier-Claus *et al.* 2012). Still, to date, results of studies assessing potentially traumatic events, such as war or terror, in this population have been as unclear as in the general population. At least one study showed an increase in psychiatric hospital readmissions at short term and a reduction at long term (Levav *et al.* 2006), whereas another study showed increased rates of coercive hospitalisations but no change in voluntary admissions (Catalano *et al.* 2004). Smaller studies within psychiatric institutions have shown minimal or no increment in help seeking or medication intake for this population (Ben-dor *et al.* 1994; Gelkopf *et al.* 1995).

Unfortunately, due to the difficulty in performing well-controlled studies in this domain, major methodological limitations seriously curtail our ability to arrive at clear conclusions. A first problem lies in the use of potentially biased self-report measures such as the number of times one went to see a physician or took psychiatric medication in the past month (Bleich *et al.* 2003; Boscarino *et al.* 2003). A second issue lies in the fact that many studies have assessed one-time traumatic events such as 9/11 (Catalano *et al.* 2004), the impact of which might be too short-lived to affect behavioural measures such as medication intake or visits to physicians – especially in the case of the majority of the population who had not been directly exposed. On the other hand, a number of studies have assessed the *ongoing* impact of war and terror (Curran, 1988; Goldberg *et al.* 2013) but without the possibility to observe service utilisation after cessation of hostilities (Levav *et al.* 2006), or have confounded exposure chronicity with exposure severity (Goldberg *et al.* 2013). A third pitfall of some of the epidemiological studies lies in the use of data aggregated over periods that do not permit adequate comparisons, such as averaged 1-year service use (Boscarino *et al.* 2005; Goldberg *et al.* 2013), the absence of solid time-related data to make up for 'natural' changes over time in service and medication use (Boscarino *et al.* 2003; Rosenheck & Fontana, 2003) or the absence of a non-exposed matched control group (Levav *et al.* 2006).

In light of the importance of preparing for effective mental health planning in case of war, the current study utilised data from a large cohort of Israeli residents receiving health services from one of the major health maintenance organisations (HMOs) in Israel. Changes in health care utilisation and psychiatric medication use were examined before, during and after the 2006 Lebanon War among three groups: general population, people 'at risk' for depression or anxiety and severely mentally ill individuals. Given that exposure to traumatic events is a pathogenic factor known to cause and exacerbate somatic and psychiatric distress and disorder (Solomon *et al.* 2005), we hypothesised that healthcare service utilisation would increase in populations exposed to war, especially among more vulnerable populations such as those with mental illness.

Methods

The 2006 Lebanon War was a 34-day military conflict in northern Israel and Lebanon. The conflict started on 12 July 2006 – with little or no warning to the civilian population, and continued until a United Nations-brokered ceasefire went into effect on 14 August 2006. During the war, Hezbollah fired approximately 4000 rockets at a rate of more than 100 per day (Press Association, 2006). An estimated 23% of these rockets hit cities and residential areas across northern Israel. The current study utilises a nested case–control design to examine the changes in health care utilisation and use of psychiatric medication during the 2006 Lebanon war. This study was approved by the Institutional Review Board of Maccabi Healthcare Services (MHS).

MHS database

MHS is one of four HMOs providing universal healthcare services to the citizens of Israel. The HMOs in Israel are obligated since the mid-1990s to insure every citizen who wishes to join them, irrespective of age, sex or medical history. MHS insures 1.9 million members of all ages (25% of the total population) (Cohen, 2013). The age distribution amongst MHS members is similar to that of the general Israeli population, although MHS market share is relatively low among non-Jews and relatively high among new immigrants (Kodesh *et al.* 2012).

MHS's central databases are automatically updated with every hospitalisation, visit to a physician, dispensed prescription, laboratory test, medical treatment,

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nurse care, physiotherapy treatment or any other medical service rendered to the insured individual (Chodick *et al.* 2010). For purposes of this study, data were obtained regarding Emergency Room (ER) visits, visits to general practitioners (GPs) and psychiatrists, and dispensed prescriptions for all individuals aged 21 or older who were insured by MHS prior to January 2006.

Additionally, MHS's psychiatric registry was used to identify patients who were diagnosed with SMI prior to 2006. This registry is one of several on-going computerised patient registries that are routinely validated by community physicians and other healthcare workers. The psychiatric registry includes all patients who were diagnosed with schizophrenia (all subtypes of schizophrenia and schizoaffective disorders) and bipolar affective disorder (bipolar I, bipolar II and mania) since 2003. SMI incidence dates, as documented in the registry, are based on the earliest documentation of the diagnosis of schizophrenia or bipolar disease in the medical records (Kodesh *et al.* 2012).

Study population

In January 2006, 1 027 645 Israeli citizens over the age of 21 were insured by MHS. Data on socio-economic status (SES) was available for 818 837 of the individuals (80% of the cohort). Of these, 142 345 (16.8%) resided in northern Israel. The proportion of women and immigrants was slightly higher in the northern region as compared with other regions (53.2 *v.* 52.6%, $p < 0.001$; 36.7 *v.* 29.9%, $p < 0.001$, respectively), the mean age was higher (43.8 *v.* 42.7, $p < 0.001$) and the SES level was lower (11.4 *v.* 11.9, $p < 0.001$).

We were interested to know if the war had a different effect on people with/without mental illness. For this purpose, three mutually exclusive study groups were defined: people with SMI prior to 2006 (as defined by MHS's psychiatric registry), people 'at risk' for depression or anxiety prior to 2006 (defined according to use of antidepressants – at least three consecutive purchases between the years 2003 and 2005) and general population (people who did not belong to either of the previous groups).

The following was done for each of the three study groups separately: for each individual from northern Israel we identified two controls from other regions. Controls were matched for sex, age, country of birth and SES. Four-hundred and ninety-eight individuals from northern Israel were excluded from the analyses as two matched controls could not be identified. Thus, the final analytic sample included 141 847 individuals from northern Israel and 283 694 controls from other regions (see Fig. 1). The mean age of the sample was 43.8 years (S.D. = 14.9); 47% were males.

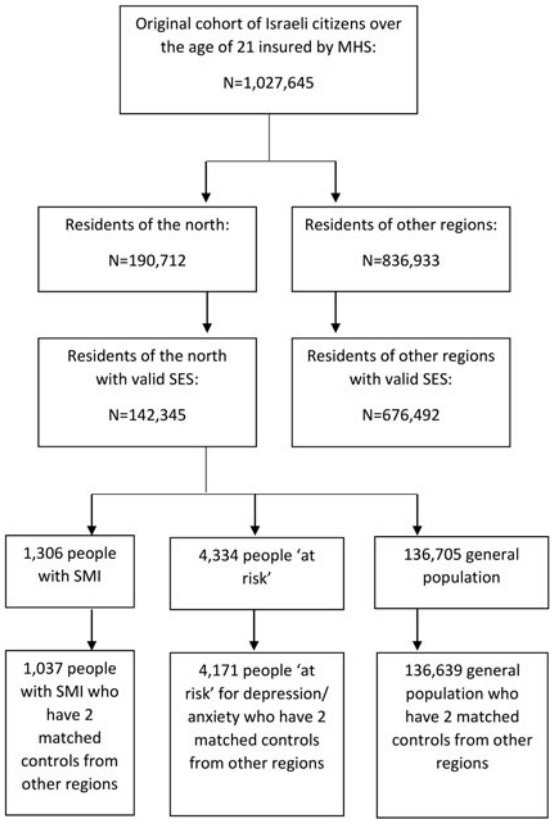

Fig. 1. Study population.

Statistical analyses

This study aimed to examine changes in health care utilisation and use of psychiatric medication during the 2006 Lebanon War. For this purpose, we compared monthly trends of service and medication use between residents of northern Israel and their matched controls. To be consistent with the dates of the war, the months defined in this study were not calendar months but rather started and ended mid-month (e.g., the first month was defined as mid-January to mid-February 2006).

Purchases of benzodiazepines, antidepressants and antipsychotic medications were identified from all the medications purchased in pharmacies by MHS members during 2006. Drug consumption data were expressed as defined daily doses (DDDs), summing all DDDs per person per month. Individuals who were not prescribed any of the aforementioned medications were given the value of '0' for total DDD consumption.

Similarly, number of visits to GPs, psychiatrists and ERs were summed per person per month. People who did not utilise these services were given the value of '0' for the number of monthly visits.

Three-way repeated measures ANOVA was used, including the variables time (12 measurements), region

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(north/other) and study group. We included a three-way interaction term – time × region × group. Guided by the results of these models, all analyses were stratified by study group. Two-way repeated measures ANOVA was used to determine the main effect of time, region and time × region interaction. Effect sizes (Cohen's *d* (Cohen, 1988)) were calculated for differences between people from northern Israel and their controls.

All analyses were performed using the software package SPSS 21.

Results

Service utilisation

To see if the war had a different effect on people with/without mental illness we examined the three-way interaction – time × region × group. The interaction term was significant for GP visits ($F = 3.76$, $p < 0.001$), psychiatrist visits ($F = 62.09$, $p < 0.001$) and ER visits ($F = 2.02$, $p < 0.01$) suggesting that the comparison of time trends in service utilisation between people from northern Israel and their matched control differs among the three study groups. Thus, the next analyses were stratified by study group.

Results of the two-way repeated measures ANOVA are presented in Table 1. For GP visits, the findings suggest that there was a significant main effect of time (all p's < 0.001) and region (all p's < 0.02) in all three groups. The time × region interaction was also significant among the three study groups (all p's < 0.03). A closer inspection of the data (Table 2) suggests that the main effect of time is due to minor fluctuations in the mean number of visits per month that do not follow a particular pattern. As can be seen, the main effect of region is driven by the higher number of GP visits among controls in all three study groups. To test if the time × region interactions were due to changes in service utilisation during the month of the war, we examined the monthly effect sizes. Among both the general population and 'at risk' groups there was a decline in the number of GP visits during the war which was not observed in the control group, resulting in a larger ES than that observed in the preceding and following months (see Fig. 2). Among people with SMI, the differences between regions did not appear to be specific to the month of the war.

For psychiatrist visits, the findings suggest that there was a significant main effect of time (all p's < 0.001) and region in all three groups (all p's < 0.02; Table 1). The time × region interaction was significant in all three study groups (all p's < 0.01). As seen in Table 2, among all three study groups, the time × region interactions appear to be driven by a decline in the number of psychiatrist visits during the war among people from northern Israel which did not occur to the same extent in the control group, resulting in a larger ES than that observed in the preceding and following months (see Fig. 3).

Mean number of monthly ER visits was low in all three study groups (Table 2). The findings suggest that there was a significant main effect of time (all

Table 1. *Service and medication use – two-way repeated measures ANOVA by study group* (F, p)

		Main effect – time	Main effect – region	Time × region interaction
GP visits	General population	1157.0, <0.001	521.8, <0.001	87.3, <0.001
	People with SMI	35.3, <0.001	5.4, 0.02	1.9, 0.03
	People with depression/anxiety	105.6, <0.001	22.0, <0.001	7.5, <0.001
Psychiatrist visits	General population	63.0, <0.001	5.6, 0.02	8.9, <0.001
	People with SMI	20.1, <0.001	5.5, 0.02	2.2, 0.01
	People with depression/anxiety	34.6, <0.001	6.0, 0.01	7.8, <0.001
ER visits	General population	10.4, <0.001	421.8, <0.001	1.4, 0.19
	People with SMI	1.23, 0.26	0.01, 0.93	1.0, 0.48
	People with depression/anxiety	2.22, 0.01	22.1, <0.001	1.5, 0.13
Benzodiazepine use	General population	52.0, <0.001	21.2, <0.001	2.7, 0.002
	People with SMI	1.9, 0.03	6.9, 0.01	0.8, 0.61
	People with depression/anxiety	13.2, <0.001	37.4, <0.001	1.2, 0.27
Antidepressant use	General population	141.1, <0.001	51.3, <0.001	6.0, <0.001
	People with SMI	2.3, 0.01	1.0, 0.32	0.6, 0.84
	People with depression/anxiety	32.0, <0.001	0.01, 0.99	1.0, 0.42
Antipsychotic use	General population	2.4, 0.01	0.4, 0.55	1.3, 0.23
	People with SMI	3.5, <0.001	0.2, 0.67	0.4, 0.96
	People with depression/anxiety	1.4, 0.18	2.0, 0.16	1.2, 0.29

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Table 2. *Service utilisation by month and study group (mean ± S.D.)*

	Month	GP visits			Psychiatrist visits			ER visits		
		North	Controls	ES[a]	North	Controls	ES	North	Controls	ES
General population	1	0.12 ± 0.5	0.15 ± 0.5	−0.06	0.002 ± 0.05	0.002 ± 0.05	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	2	0.19 ± 0.6	0.22 ± 0.6	−0.04	0.002 ± 0.05	0.002 ± 0.05	0.00	0.01 ± 0.1	0.01 ± 0.1	0.03
	3	0.21 ± 0.6	0.23 ± 0.6	−0.04	0.002 ± 0.05	0.002 ± 0.05	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	4	0.19 ± 0.6	0.21 ± 0.6	−0.04	0.001 ± 0.04	0.002 ± 0.05	−0.01	0.01 ± 0.1	0.01 ± 0.1	0.02
	5	0.21 ± 0.6	0.23 ± 0.6	−0.04	0.002 ± 0.05	0.002 ± 0.05	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	6	0.20 ± 0.6	0.23 ± 0.6	−0.04	0.002 ± 0.05	0.002 ± 0.05	−0.01	0.01 ± 0.1	0.01 ± 0.1	0.02
	7 (war)	0.15 ± 0.5	0.22 ± 0.6	−0.13	0.001 ± 0.03	0.002 ± 0.05	−0.03	0.01 ± 0.1	0.01 ± 0.1	0.02
	8	0.20 ± 0.6	0.22 ± 0.6	−0.04	0.002 ± 0.06	0.002 ± 0.05	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	9	0.18 ± 0.5	0.19 ± 0.6	−0.02	0.002 ± 0.05	0.002 ± 0.04	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	10	0.22 ± 0.6	0.25 ± 0.7	−0.05	0.002 ± 0.06	0.002 ± 0.06	0.00	0.01 ± 0.1	0.01 ± 0.1	0.02
	11	0.21 ± 0.6	0.23 ± 0.6	−0.04	0.002 ± 0.05	0.002 ± 0.05	−0.01	0.01 ± 0.1	0.01 ± 0.1	0.03
	12	0.23 ± 0.6	0.26 ± 0.7	−0.05	0.004 ± 0.07	0.003 ± 0.06	0.01	0.01 ± 0.1	0.01 ± 0.1	0.02
People with SMI	1	0.14 ± 0.5	0.21 ± 0.6	−0.13	0.09 ± 0.3	0.10 ± 0.4	−0.04	0.02 ± 0.2	0.01 ± 0.1	0.04
	2	0.34 ± 0.8	0.39 ± 0.9	−0.06	0.06 ± 0.3	0.10 ± 0.3	−0.11	0.01 ± 0.1	0.02 ± 0.2	−0.03
	3	0.40 ± 0.9	0.41 ± 0.8	−0.01	0.09 ± 0.3	0.10 ± 0.3	−0.04	0.02 ± 0.1	0.02 ± 0.2	−0.02
	4	0.36 ± 0.8	0.43 ± 0.9	−0.09	0.06 ±0.3	0.08 ± 0.3	−0.09	0.02 ± 0.1	0.02 ± 0.2	−0.04
	5	0.43 ± 1.0	0.45 ± 0.9	−0.02	0.09 ± 0.3	0.10 ± 0.3	−0.04	0.02 ± 0.1	0.02 ± 0.2	−0.04
	6	0.37 ± 0.9	0.40 ± 0.9	−0.03	0.09 ± 0.3	0.09 ± 0.3	−0.01	0.02 ± 0.1	0.02 ± 0.1	0.00
	7 (war)	0.32± 0.7	0.43 ± 0.9	−0.12	0.03 ± 0.2	0.09 ± 0.3	−0.20	0.02 ± 0.1	0.01 ± 0.1	0.03
	8	0.39 ± 1.0	0.41 ± 0.9	−0.02	0.08 ± 0.3	0.11 ± 0.4	−0.09	0.03 ± 0.2	0.02 ± 0.1	0.06
	9	0.34 ± 0.8	0.36 ± 0.8	−0.03	0.06 ± 0.3	0.07 ±0.3	−0.03	0.02 ± 0.2	0.03 ± 0.2	−0.02
	10	0.45 ± 1.0	0.50 ± 1.0	−0.05	0.09 ± 0.3	0.11 ± 0.4	−0.06	0.02 ± 0.2	0.01 ± 0.1	0.04
	11	0.37 ± 0.8	0.48 ± 1.0	−0.12	0.09 ± 0.3	0.11 ± 0.4	−0.03	0.02 ± 0.2	0.02 ± 0.2	0.01
	12	0.37 ± 0.8	0.46 ± 0.9	−0.10	0.15 ± 0.4	0.15 ± 0.4	−0.01	0.02 ± 0.1	0.02 ± 0.1	−0.01
People 'at risk' for depression/anxiety	1	0.22 ± 0.7	0.28 ± 0.7	−0.08	0.06 ± 0.3	0.08 ± 0.3	−0.05	0.02 ± 0.2	0.02 ± 0.1	0.03
	2	0.42 ± 0.9	0.46 ± 0.9	−0.04	0.05 ± 0.3	0.06 ± 0.3	−0.02	0.02 ± 0.1	0.01 ± 0.1	0.02
	3	0.45 ± 0.9	0.51 ± 0.9	−0.06	0.05 ± 0.3	0.06 ± 0.3	−0.02	0.02 ± 0.1	0.02 ± 0.2	−0.02
	4	0.42 ± 0.9	0.46 ± 0.9	−0.05	0.05 ± 0.2	0.05 ± 0.2	−0.02	0.02 ± 0.2	0.01 ± 0.1	0.05
	5	0.47 ± 0.9	0.50 ± 0.9	−0.03	0.05 ± 0.3	0.06 ± 0.3	−0.03	0.02 ± 0.2	0.01 ± 0.1	0.05
	6	0.46 ± 0.9	0.50 ± 0.9	−0.05	0.05 ± 0.2	0.06 ± 0.3	−0.03	0.02 ± 0.1	0.01 ± 0.1	0.03
	7 (war)	0.34 ± 0.8	0.50 ± 1.0	−0.18	0.02 ± 0.2	0.06 ± 0.3	−0.15	0.01 ± 0.1	0.01 ± 0.1	0.01
	8	0.46 ± 0.9	0.48 ± 0.9	−0.02	0.05 ± 0.3	0.05 ± 0.3	0.00	0.02 ± 0.2	0.02 ± 0.2	0.01
	9	0.40 ± 0.8	0.43 ± 0.8	−0.04	0.03 ± 0.2	0.04 ± 0.2	−0.03	0.02 ± 0.2	0.02 ± 0.1	0.03

Continued

Table 2. *Continued*

Month	GP visits			Psychiatrist visits			ER visits		
	North	Controls	ES[a]	North	Controls	ES	North	Controls	ES
10	0.47 ± 0.9	0.55 ± 1.0	−0.09	0.05 ± 0.2	0.06 ± 0.3	−0.05	0.02 ± 0.2	0.02 ± 0.1	0.06
11	0.42 ± 0.9	0.47 ± 0.9	−0.05	0.05 ± 0.2	0.05 ± 0.2	−0.01	0.02 ± 0.2	0.01 ± 0.1	0.04
12	0.45 ± 0.9	0.50 ± 0.9	−0.05	0.09 ± 0.3	0.07 ± 0.3	0.05	0.02 ± 0.2	0.01 ± 0.1	0.05

[a]ES, effect size (Cohen's *D*) comparing cases with controls.

p's <0.01) and region (all *p*'s <0.001) among people from the general population and people 'at risk' for depression/anxiety (see Table 1). The time × region interaction was not significant in any of the study groups, suggesting that the change across time was similar among people from northern Israel and their matched controls.

Use of psychiatric medication

The three-way interaction term, time × region × study group was significant for all three types of medications examined in this study: benzodiazepines ($F = 9.65$, $p < 0.001$), antidepressants ($F = 13.05$, $p < 0.001$) and antipsychotics ($F = 12.07$, $p < 0.001$).

As can be seen in Table 1, there was a significant main effect of time in the three study groups for use of benzodiazepines (all *p*'s <0.03) and antidepressants (all *p*'s <0.01). Similarly, in two of the three study groups there was a main effect of time for use of antipsychotics (general population and people with SMI; *p*'s <0.01). Significant main effects of region were observed mainly regarding the use of benzodiazepines (all *p*'s <0.01), with greater use among people from northern Israel than their matched controls among all three study groups. The time × region interaction was significant only among the general population group, regarding the use of benzodiazepines and antidepressants. A closer inspection of the data (Table 3) suggests that this interaction does not appear to be driven by differences between people from northern Israel and their matched controls that can be attributed to the war (i.e., no stark difference in the ES is observed in the month of the war).

Discussion

The current study used a nested case–control design to compare health care utilisation and psychiatric medication use before, during and after the 2006 Lebanon War among the three groups: general population, people 'at risk' for depression/anxiety and severely mentally ill individuals. The findings suggest that during the month of the war there was a decline in GP visits among people from the general population and people 'at risk' for depression/anxiety who resided in northern Israel that was not paralleled among controls from other regions. Similar findings were observed for psychiatrist visits in all three study groups. There were no changes in ER visits or use of psychiatric medication that could be attributed to the war.

To the best of our knowledge, this is the first nationwide study to examine the impact of war on patterns of healthcare service utilisation across time. The

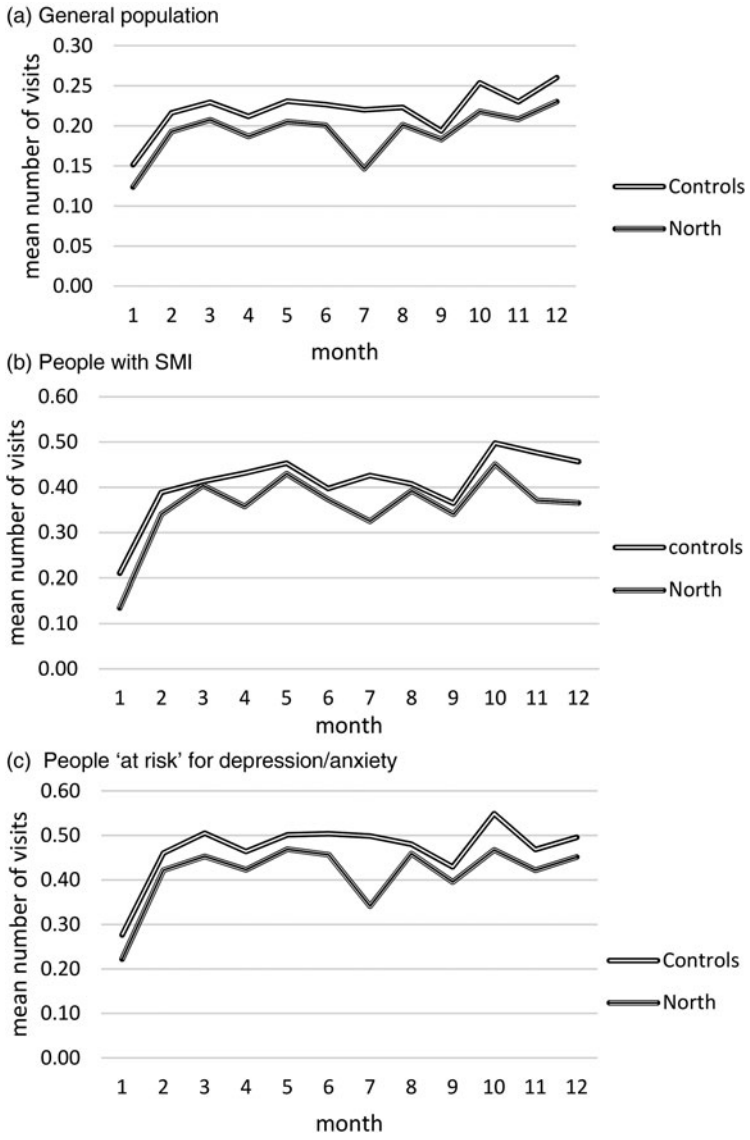

Fig. 2. Number of GP visits by month – a comparison between people from northern Israel and controls.

findings suggest that there is *less* utilisation of community services at times of war among exposed populations, and that there is no compensation in use of emergency services, nor any compensation during the period after the war.

There may be a number of reasons why service use was reduced. First, services may have been less available, although according to an MHS report assessing the functioning of services during the war, the vast majority of clinics in northern Israel were open during the war (MHS internal report). Second, it is possible that even though individuals with or without mental health problems may be stressed during times of war, leaving the relative security of the house may be more stressful than the expected benefit of receiving support. This was reinforced by the Home Front Command's instructions to citizens to remain near shelters. A further reason for the reduction in service utilisation may lie in the fact that many individuals (approximately 30% according to reports in the Israeli media) left the region during the war, thereby temporarily reducing service use. Thus, service utilisation at times of war may be confounded by other variables and may not serve as a direct measure of increased stress.

Interestingly, there was no compensatory use of services *after the war*. It is important to note that in the current case of the Israel–Lebanon 2006 War, once the ceasefire was signed no further shelling was noted. Additionally, no major infrastructural setting was hit during the war. This permitted individuals an immediate return to normalcy with a minimum level of felt threat, and therefore possibly no need for additional services.

Although a small reduction in service utilisation was noted, there was no change in use of psychiatric

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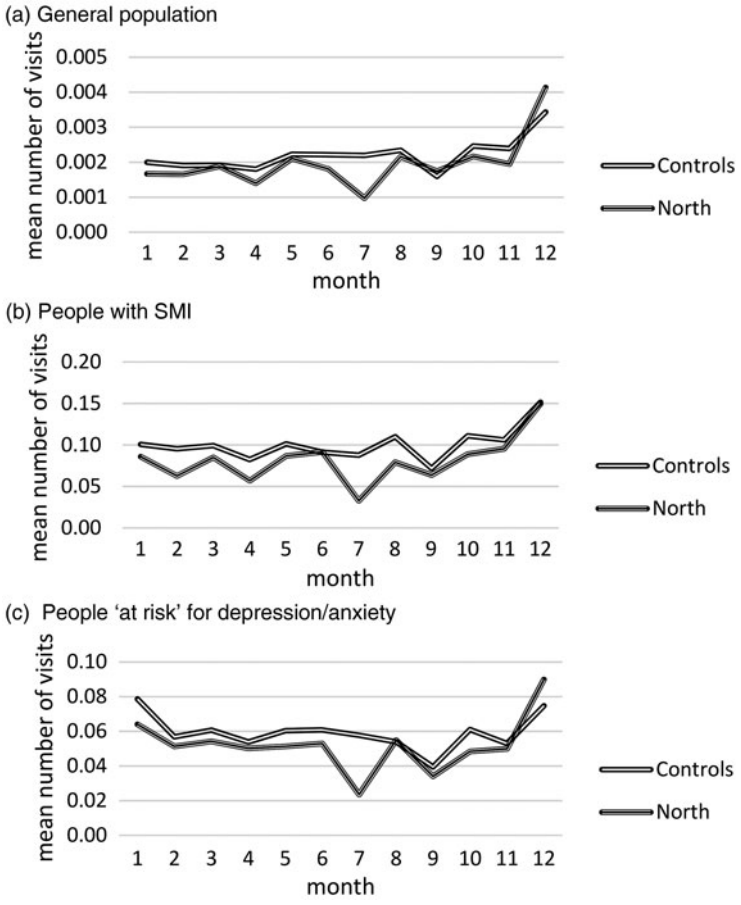

Fig. 3. Number of psychiatrist visits by month – a comparison between people from northern Israel and controls.

medications in any of the three study groups. This finding has been reported previously in studies that were conducted in the USA following 9/11 (Druss & Marcus, 2004; Boscarino *et al.* 2005), and appears to be replicated in the current study where people were exposed to prolonged traumatic events. This may suggest that if there is an efficient medical and mental health infrastructure, people with or without psychiatric risk factors can tolerate a few weeks of a mass stress event, with no need to expand medical service utilisation, including consumption of psychiatric medications.

The results of the current study contradict those of a previous retrospective cross-sectional study conducted in two clinics in southern Israel exposed to prolonged rocket attacks (Goldberg *et al.* 2013). Their findings suggest that there was an increase in visits and in the number of anxiolytic prescriptions, as well as a decrease in ER visits, in the study clinic compared with controls. However, unlike the current study, that study examined aggregated annual trends of service utilisation and did not differentiate between different population groups. An additional Israeli study assessing the impact of chronic terror in Jerusalem (Levav *et al.* 2006) reported mixed findings: while exposure to terror showed little impact on medication intake, there was a small increase in GP visits and psychiatric readmissions, and a decrease in the number of first psychiatric visits.

Study limitations

The current results reflect the reactions of a large population to a limited national war. This war was limited in time (1 month), in scope (only shelling), geographically (only part of the country was exposed) and the threat originated only from one country, namely Lebanon. Furthermore, it is important to note that Israel is a Western country where all the infrastructures (from running water and social and medical services to transport) continued relatively unhampered during the entire period. As previously noted, life returned to normalcy immediately and completely after the ceasefire was declared. The shelling stopped abruptly, and the civilian death toll was 43. Results can thus not be generalised to conflicts of other nature such as civil war, or wars that include invasion and that have long-lasting consequences on civilian lives after the cessation of hostilities.

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Table 3. *Use of psychiatric medication by month and study group (mean ± S.D.)*

	Month	Benzodiazepines			Antidepressants			Antipsychotics		
		North	Controls	ES[a]	North	Controls	ES	North	Controls	ES
General population	1	0.87 ± 6.7	0.80 ± 6.4	0.01	0.13 ± 2.3	0.17 ± 2.8	−0.01	0.07 ± 2.6	0.07 ± 2.6	0.00
	2	0.74 ± 5.8	0.69 ± 5.5	0.01	0.14 ± 2.4	0.15 ± 2.5	−0.01	0.05 ± 1.8	0.06 ± 2.6	0.00
	3	0.83 ± 6.2	0.75 ± 6.1	0.01	0.17 ± 2.8	0.20 ± 3.0	−0.01	0.07 ± 2.2	0.08 ± 3.8	0.00
	4	0.80 ± 6.0	0.75 ± 6.0	0.01	0.16 ± 2.7	0.20 ± 3.1	−0.01	0.07 ± 3.0	0.06 ± 2.6	0.00
	5	0.85 ± 6.3	0.80 ± 6.2	0.01	0.21 ± 3.4	0.24 ± 3.4	−0.01	0.07 ± 2.6	0.06 ± 2.2	0.00
	6	0.83 ± 6.3	0.78 ± 6.1	0.01	0.20 ± 3.0	0.26 ± 3.6	−0.02	0.07 ± 2.3	0.07 ± 2.8	0.00
	7 (war)	0.85 ± 6.3	0.78 ± 6.0	0.01	0.19 ± 3.0	0.27 ± 3.7	−0.02	0.07 ± 3.9	0.07 ± 2.6	0.00
	8	0.92 ± 6.6	0.80 ± 6.1	0.02	0.23 ± 3.7	0.30 ± 3.9	−0.02	0.07 ± 2.5	0.07 ± 2.4	0.00
	9	0.80 ± 6.1	0.70 ± 5.5	0.02	0.21 ± 3.0	0.26 ± 3.5	−0.02	0.08 ± 4.1	0.06 ± 2.4	0.00
	10	0.91 ± 6.7	0.85 ± 6.5	0.01	0.25 ± 3.5	0.32 ± 4.1	−0.02	0.08 ± 4.1	0.07 ± 2.5	0.00
	11	0.88 ± 6.4	0.79 ± 6.2	0.01	0.26 ± 3.6	0.33 ± 4.1	−0.02	0.07 ± 2.3	0.07 ± 2.8	0.00
	12	0.82 ± 6.3	0.75 ± 5.8	0.01	0.27 ± 3.6	0.34 ± 4.4	−0.02	0.07 ± 2.5	0.07 ± 2.5	0.00
People with SMI	1	8.31 ± 25.1	7.36 ± 27.6	0.04	9.63 ± 25.5	9.24 ± 28.0	0.01	11.01 ± 29.9	11.91 ± 33.3	−0.03
	2	8.23 ± 25.1	6.11 ± 27.1	0.08	9.03 ± 21.0	8.08 ± 24.5	0.04	10.38 ± 32.1	10.20 ± 28.4	0.01
	3	8.23 ± 23.3	6.75 ± 26.1	0.06	9.81 ± 23.9	8.47 ± 24.8	0.06	11.09 ± 30.2	12.01 ± 32.1	−0.03
	4	8.92 ± 27.5	6.48 ± 25.0	0.09	9.09 ± 22.3	8.88 ± 26.6	0.01	9.95 ± 26.7	10.88 ± 27.8	−0.03
	5	8.64 ± 23.8	6.64 ± 24.9	0.08	9.74 ± 22.3	9.10 ± 25.8	0.03	11.30 ± 32.8	11.61 ± 31.4	−0.01
	6	8.24 ± 24.4	6.24 ± 22.7	0.08	9.58 ± 23.9	8.62 ± 25.1	0.04	10.67 ± 29.5	11.27 ± 31.1	−0.02
	7 (war)	8.69 ± 28.5	6.62 ± 25.5	0.08	9.16 ± 24.1	8.23 ± 23.6	0.04	11.22 ± 32.8	12.28 ± 32.3	−0.03
	8	9.81 ± 29.8	6.69 ± 25.5	0.11	9.94 ± 24.4	8.49 ± 26.7	0.06	11.94 ± 33.6	12.00 ± 34.4	0.00
	9	7.53 ± 24.9	5.80 ± 21.1	0.07	8.50 ± 21.7	7.25 ± 21.0	0.06	9.72 ± 27.7	10.07 ± 29.8	−0.01
	10	9.14 ± 32.7	6.75 ± 23.1	0.08	9.27 ± 21.3	9.33 ± 27.6	0.00	12.06 ± 33.1	11.99 ± 29.3	0.00
	11	9.12 ± 26.7	6.64 ± 24.6	0.10	9.72 ± 25.2	9.41 ± 27.6	0.01	11.38 ± 30.5	11.15 ± 28.3	0.01
	12	8.35 ± 26.2	6.50 ± 25.5	0.07	9.67 ± 25.2	9.21 ± 28.0	0.02	11.65 ± 31.4	11.80 ± 33.0	0.00
People 'at risk' for depression/anxiety	1	9.32 ± 24.4	7.40 ± 22.1	0.08	20.12 ± 29.2	19.67 ± 30.6	0.02	0.84 ± 7.4	0.72 ± 7.6	0.02
	2	8.18 ± 21.5	6.32 ± 18.3	0.09	17.32 ± 26.7	17.14 ± 27.6	0.01	0.80 ± 7.0	0.66 ± 7.9	0.02
	3	9.10 ± 22.8	6.89 ± 22.0	1.00	19.74 ± 29.3	19.15 ± 29.7	0.02	0.77 ± 6.7	0.69 ± 7.5	0.01
	4	9.40 ± 28.5	6.95 ± 21.1	1.00	18.03 ± 28.1	17.64 ± 28.8	0.01	0.82 ± 7.7	0.60 ± 5.9	0.03
	5	9.71 ± 25.2	7.17 ± 22.5	1.00	19.03 ± 29.3	18.89 ± 29.9	0.00	0.67 ± 5.8	0.64 ± 7.3	0.00
	6	9.16 ± 25.5	7.05 ± 23.0	0.09	17.59 ± 26.3	17.84 ± 30.3	−0.01	1.04 ± 10.4	0.66 ± 7.3	0.04
	7 (war)	8.83 ± 24.6	6.96 ± 21.6	0.08	17.56 ± 28.1	17.66 ± 29.2	0.00	0.77 ± 7.1	0.71 ± 10.2	0.01
	8	9.87 ± 26.9	7.45 ± 23.3	1.00	17.70 ± 27.8	18.40 ± 30.1	−0.02	0.82 ± 8.1	0.83 ± 14.5	0.00
	9	8.27 ± 22.1	6.13 ± 19.0	1.00	16.05 ± 26.5	15.99 ± 26.9	0.00	0.75 ± 7.4	0.55 ± 5.9	0.03

Continued

Table 3. *Continued*

Month	Benzodiazepines			Antidepressants			Antipsychotics		
	North	Controls	ES[a]	North	Controls	ES	North	Controls	ES
10	9.33 ± 25.6	7.42 ± 23.4	0.08	18.12 ± 30.6	18.72 ± 31.1	−0.02	0.95 ± 9.1	0.66 ± 6.5	0.04
11	9.00 ± 27.7	6.93 ± 21.3	0.08	17.93 ± 30.5	17.69 ± 29.9	0.01	0.88 ± 8.4	0.69 ± 8.0	0.03
12	7.96 ± 21.1	6.49 ± 20.6	0.07	16.11 ± 27.0	16.46 ± 27.5	−0.01	0.88 ± 8.0	0.62 ± 6.3	0.04

[a]ES, effect size (Cohen's *D*) comparing cases with controls.

A second limitation lies in the fact that service utilisation, as assessed in this study, was drawn from MHS registries that are created as part of routine clinical care rather than for research purposes. As such, chance variability may hinder interpretation of the data by showing apparent differences that are not real or by obscuring real differences (Powell *et al.* 2003). Additionally, the data drawn from MHS registries for purposes of this study do not include data on hospital admissions (general or psychiatric). Data on utilisation of private medical services (out-of-pocket services, not covered by MHS), substance use and calls to hotlines were not available. The latter may represent reactions to stress and have previously been reported to increase at times of national crisis (substance use as reported by (Vlahov *et al.* 2002); telephone hotline service use as reported by (Wunsch-Hitzig *et al.* 2002; Bleich *et al.* 2003)).

These limitations notwithstanding, the current study used a nested case–control design to explore the effects of exposure to war on the use of basic medical community services in three large and distinct populations. As the current study did not assess sex differences, and as reactions to traumatic events are known to vary by sex (Solomon *et al.* 2005), future studies should examine whether patterns of healthcare service utilisation during and in the aftermath of war differ between men and women. Additionally, to better understand the discrepancy between clinical data showing significantly high levels of PTSD in the population after major traumatic events and findings such as those of the current study showing minimal changes in medication and service utilisation, data on health care utilisation should be linked to clinical data regarding psychopathology (such as, PTSD, depression and anxiety). Such data will assist in differentiating between normal pathological reactions and those requiring further care.

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Statement of Interest

We declare no competing interests.

Ethical Standard

The authors assert that all procedures contributing to this work comply with the ethical standards of the

relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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