The Emergency Department in a Region under Missile Attack: Utilization Patterns during Operation Cast Lead

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ABSTRACT: **Background:** During military escalations emergency departments provide treatment both to victims of conflict-related injuries and to routine admissions. This requires special deployment by the hospitals to optimize utilization of resources.
Objectives: To evaluate routine visits to the ED during Operation Cast Lead in Israel in 2008–2009.
Methods: We obtained data regarding routine visits to the ED at Soroka University Medical Center throughout OCL. The visits one month before and after OCL and the corresponding periods one year previous served as controls.
Results: The mean number of daily visits throughout the study period (126 days) was 506 ± 80.9, which was significantly lower during OCL (443.5 ± 82) compared with the reference periods ($P < 0.001$). Compared to the reference periods, during OCL the rates were higher among Bedouins, visitors from the region closest to the Gaza Strip (< 30 km), patients transported to the ED by ambulance and patients of employment age; the rates were lower among children. No difference in the different periods was found in the rate of women patients, the rate of patients referred to the ED by a community physician, and hour of arrival. The overall in-hospital admission rate increased during OCL, mainly in the internal medicine and the obstetric departments. There was no change in the number of in-hospital births during OCL; however, the rate of preterm labors (32–36 weeks) decreased by 41% ($P = 0.013$).
Conclusions: Throughout OCL the number of routine ED visits decreased significantly compared to the control periods. This finding could help to optimize the utilization of hospital resources during similar periods.

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KEY WORDS: military medicine, emergency service, hospital, patient admission

ED = emergency department
OCL = Operation Cast Lead

During stressful periods (e.g., military escalations) involving an influx of injuries, hospitals in Israel tend to reduce the number of admissions, postpone elective procedures, and discharge patients more liberally in order to be more prepared to receive the injured [1]. However, during such periods hospital emergency departments provide treatment to victims of warfare-related injuries as well as to routine patient admissions around the clock. This requires special deployment by the hospitals to optimize the utilization of their resources, as reported by Bar-El et al. concerning the Second Lebanon War in 2006 [1]. During warfare, changes in the utilization of medical services by the involved populations have been observed, but findings with regard to the patterns of these changes are controversial. According to some studies, a decline in ambulatory and family practice visits, but not to the ED, occurred during periods of military conflict [2,3]; other studies reported a reduction in the number of routine visits to the ED during such stressful periods [4-6]. Furthermore, changes in visit patterns have also been observed, e.g., a reduction in the number of motor vehicle accidents and an increase in the incidence of myocardial infarction and other emergency medical conditions [6-8].

Operation Cast Lead (27 December 2008 to 17 January 2009) was characterized by massive missile bombardment of southern Israeli cities and by conflicts in the Gaza Strip [9]. This led to disruption in the daily lives of the residents: schools, kindergartens and recreation facilities were often closed; and residents spent much time in shelters or even temporarily moved to safer regions in the country, which resulted in a significant decrease in traffic and commercial activities. Throughout OCL the already stressed emergency department of the Soroka University Medical Center was faced with a constant influx of patients (soldiers and civilians) with injuries and conditions caused by the warfare. Throughout the operation close to 600 rockets were launched towards southern Israel. The Israeli toll from combat included 13 Israelis killed (10 soldiers and 3 civilians) and about 1000

injured (317 soldiers and about 700 civilians). Our medical center treated 129 soldiers and nearly 300 civilians who sustained injuries directly related to OCL. In addition, the ED faced routine visits that were not related directly to the OCL. The purpose of this study was to investigate the effect of warfare on the number, type and pattern of routine ED visits and the impact on the in-hospital admission rates during the OCL.

SUBJECTS AND METHODS

In this observational retrospective cohort study we obtained data regarding all visits to the ED of the Soroka University Medical Center, a tertiary referral center (~1000 beds) singly serving the metropolitan area of Beer Sheva (over 500,000 residents, mainly Jews and Bedouins), located in the southern Negev region of Israel, during 21 days of OCL (from its first full day, 28 December 2008, until the last day, 17 January 2009). In addition, we obtained similar data for reference periods: 21 days prior to (7–27 December 2008) and after OCL (18 January–7 February 2009), and the corresponding periods in the previous year, matched by day of the week: 30 December 2007–19 January 2008, 9–29 December 2007, and 20 January–9 February 2008 matched the period of OCL, prior to OCL, and after it, respectively. The visits directly related to the military operation (both physical and anxiety injuries of soldiers and civilians), as defined upon admission and marked by a separate administrative code, were excluded from the study.

The following data were obtained from patient files and computerized hospital and Magen David Adom Ambulance services databases and analyzed: demographics including age, gender, ethnicity (Jewish or Bedouin), and aerial distance from the patient's place of residence to the Gaza Strip boundary. ED visit characteristics included: type of ED (Internal Medicine, Surgical/Orthopedic, Pediatric, Ophthalmology/Ear, Nose and Throat, Obstetrics and Gynecology), the hour of admission, the referring authority, the manner of transport (independently or evacuation by ambulance – Magen David Adom), chief complaint, and discharge or in-hospital admission. In addition, data regarding births, including gestational age, were also obtained. Importantly, the data from Magen David Adom were obtained only from its computerized database (not from patient files) and included general data relating to particular questions rather than personal patient-based information which was retrieved from the hospital databases. The local ethics committee approved the study, which was performed in accordance with the Helsinki declaration.

DATA PROCESSING AND STATISTICAL ANALYSIS

The statistical analysis was performed using SPSS 17.0 for Windows software. All studied parameters were defined as dichotomous, categorical or continuous, and were classified in categories as follows: age was classified as babies (0–1 year), toddlers (2–5 years), school age (6–18 years), employment age (19–65 years) and retirement age (65 and older). The admission time was classified according to the nurses' shifts: morning 07:00–15:00, evening 15:00–23:00, and night 23:00–07:00. The aerial distance from the Gaza Strip was classified as ≤ 30 km (most exposed to the missile attack) and > 30 km. The number or the percentage of visits in every category was calculated for each day.

For every period we calculated the mean daily number or mean daily percentage of visits and the standard deviations. Comparisons between the six different periods were performed using the General Linear Model for Repeated Measures. The year of the data collection was defined as a Within-Subjects Factor. The periods of data collection – the OCL period and the periods before and after in the same year, and all the periods one year prior to OCL – were defined as Between-Subjects Factors. Differences in all parameters were tested between the years and between periods (in the year of OCL and the one before it, combined). In addition, the interaction between the year and the period was calculated in order to test for a difference between one or more of the periods (of the six periods) and the others beyond the differences between years and periods. P values less than 0.05 were considered statistically significant.

RESULTS

Throughout the 126 days included in the study, 63,627 routine ED visits were recorded. The characteristics of all the ED visits included in the study and the visiting patients are presented in Table 1.

The mean daily number of ED visits for the entire study period was 506.03 ± 80.86. The daily number of visits during OCL and the reference periods are shown in Figure 1. During OCL, the mean daily number of visits was lower by approximately 16% compared to the preceding period, and by approximately 14% compared to the corresponding period in the previous year [Table 2]. A statistically significant difference in the number of ED visits was found between the periods over the years but not between the years. Furthermore, a statistically significant interaction ($P < 0.001$) was found between the years and the periods, further emphasizing the exceptional decrease of ED visits during OCL.

The mean daily visit rates in terms of different patient characteristics according to the period are presented in Table 2. During OCL there was an increase in the rates of Bedouins, visitors from the region closest to the Gaza Strip (< 30 km), patients transported to the ED by ambulance, babies, and patients of employment age compared to the reference periods [Table 2].

Table 1. Characteristics of the study population, 126 days of study

Total visits (n)	63,760
DEMOGRAPHIC CHARACTERISTICS	
Age (yrs, mean, SD)	33.7, 24.3
0–1	5177 (8.1)
2–5	4501 (7.1)
6–18	7512 (11.8)
19–65	37,386 (58.8)
66 and above	9051 (14.2)
Gender	
Female	33,908 (53.2)
Ethnicity	
Jews	44,230 (69.4)
Bedouins	18,250 (28.6)
Aerial distance from the Gaza Strip	
‹ 30 km	8325 (13.2)
ADMINISTRATIVE CHARACTERISTICS OF VISITS	
Referral and transportation	
Referred by a community physician and arrived independently	56,155 (59.6)
Transported by ambulance	7876 (12.3)
Time of visit*	
Morning (07:00–15:00)	26,776 (42)
Evening (15:00–23:00)	29,410 (46.1)
Night (23:00–07:00)	7574 (11.9)
In-hospital admissions	21,013 (33)

VISITS ACCORDING TO TYPE OF ED	
Visits	
Internal Medicine ED	18,526 (29.1)
Surgical/Orthopedic ED	17,700 (27.8)
Pediatric ED	12,056 (18.9)
Obstetrics ED	7903 (12.4)
COMMON CHIEF COMPLAINTS ACCORDING TO TYPE OF ED**	
Internal Medicine ED	
Weakness, dizziness, syncope	3767 (20)
Chest pain	3175 (17.1)
Shortness of breath	2529 (13.7)
Surgical/Orthopedic ED	
Fall	3244 (18.3)
Limb injury	2671 (15.1)
Motor vehicle accident	1877 (10.6)
Work-related injuries	1537 (8.7)
Pediatric ED	
Fever	2733 (22.7)
Shortness of breath	2145 (17.8)
Abdominal pain	1748 (14.5)
Vomiting and nausea	918 (7.6)
Fall	558 (4.6)
In-hospital admissions	
Internal Medicine ED	8816 (47.6)
Surgical/Orthopedic ED	1952 (11)
Pediatric ED	4116 (34.1)
Obstetrics ED	5288 (66.9)
Births∞	
Gestational age at birth (wks) ∞∞	4175 (52.8)
36	374 (9)
37–41	3646 (87.3)
‹ 42	155 (3.7)

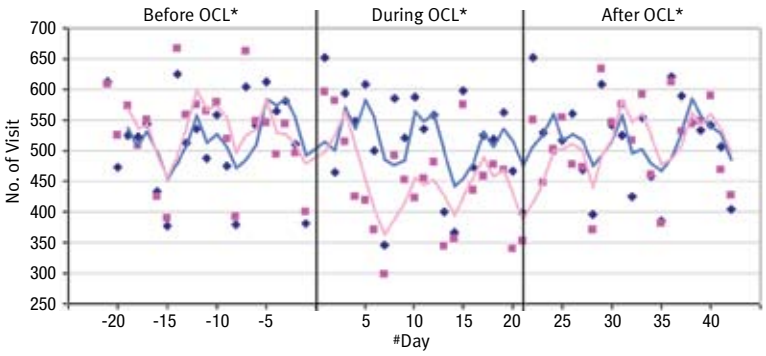
The data are presented as n (%) unless otherwise stated
*Time of visit grouped according to times of nurses' shifts
**Percent of common complaints/in-hospital admissions of visits in the special ED
∞Percent of births of all visits in the Obstetrics ED
∞∞Percent of gestational age categories of births

During the study period 21,013 visits resulted in in-hospital admission (33% of all visits). During OCL, the mean daily percent of admissions was lower by 4.3% compared to the period before OCL and the corresponding period in the previous year [Table 2].

As presented in Table 3, a relative increase of 5.3% in the Internal ED (with borderline statistical significance) and of 4.3% in the Gynecology ED in-hospital admission rates were found compared with the period before OCL. No significant increase during OCL was noted in the other EDs, which were separate from the Obstetrics and Gynecology ED. Evaluating the changes in common chief complaints between periods, we found an increase in the rate of shortness of breath in children and in limb injuries. A decrease was found in motor vehicle accidents [Table 3].

Throughout the study period 4158 births were recorded (52.6% of all visits to the Obstetrics ED resulted in births). During OCL the mean daily rate of deliveries among all visits to the Obstetrics ED increased by 4% compared to the

Figure 1. Number of daily visits to the emergency department during Operation Cast Lead and reference periods



—■— The year of OCL (moving average of 2)
—◆— The year before OCL (moving average of 2)
* and the corresponding period a year prior to OCL
# Day 1 = the first day of OCL

period before OCL and by 2.4% compared to the corresponding period in the previous year, with borderline significance [Table 3]. The mean daily rate of preterm deliveries (of all deliveries) decreased by 34.7% during OCL compared to the period before OCL.

DISCUSSION

Investigation and prediction of the utilization patterns of the emergency department resources during periods of military escalation or disasters play an important role in the general deployment of

Table 2. Characteristics of visits to the ED according to the study periods

		Period			*P*		
	Year*	Before OCL	During OCL	After OCL	Between periods	Between years	Interaction
Daily no. of visits (mean, SD)	1	517.1 (76)	514.5 (84.1)	517.4 (14.3)	0.12	0.002	<0.001
	2	529.6 (77.9)	443.5 (82.1)	514.0 (79.1)			
DEMOGRAPHIC CHARACTERISTICS							
Age groups (yrs, %)**							
0–1	1	10.2 (2.6)	6.8 (1.6)	6.3 (1.1)	<0.001	0.013	0.007
	2	11.7 (1.9)	8.0 (2.8)	5.7 (1.1)			
2–5	1	6.0 (1.6)	7.9 (1.9)	7.7 (1.3)	<0.001	0.902	0.976
	2	5.9 (1.0)	7.9 (1.8)	7.8 (1.8)			
6–18	1	12.4 (1.5)	11.2 (1.7)	11.9 (1.5)	<0.001	0.394	0.002
	2	12.9 (1.7)	9.6 (1.3)	12.4 (1.9)			
19–65	1	57.8 (3.6)	59.6 (2.8)	58.6 (1.9)	0.001	0.86	0.049
	2	56.1 (2.4)	60.2 (3.9)	59.4 (3.3)			
66 and above	1	13.4 (2.1)	14.3 (1.9)	15.2 (1.7)	0.003	0.164	0.538
	2	13.3 (2.2)	14.1 (1.2)	14.4 (1.2)			
Gender Female (%)	1	52.5 (2.5)	54.8 (1.8)	52.8 (3.0)	0.012	0.368	0.183
	2	52.9 (2.4)	53.4 (1.9)	52.7 (2.1)			
Ethnicity Bedouins (%)	1	26.6 (2.5)	26.4 (2.7)	27.6 (2.9)	0.777	< 0.001	0.054
	2	30.5 (4.1)	31.7 (2.5)	30.2 (3.1)			
Aerial distance of residence < 30 km from the Gaza Strip (%)	1	12.0 (1.1)	12.1 (1.6)	13.2 (1.3)	0.422	< 0.001	0.008
	2	13.6 (2.2)	14.4 (2.2)	13.2 (2.1)			
ADMINISTRATIVE CHARACTERISTICS OF VISITS							
Referral and transportation (%)							
Referred by a community physician and arrived independently	1	59.9 (4.0)	59.3 (5.9)	59.6 (5.6)	0.687	0.012	0.292
	2	59.6 (5.1)	57.3 (6.5)	58.6 (6.0)			
Transported by ambulance	1	11.7 (1.6)	11.7 (1.7)	12.8 (1.8)	0.422	< 0.001	0.008
	2	12.2 (1.8)	13.8 (2.4)	12.2 (1.5)			
Time of visit (%)***							
Morning (07:00–15:00)	1	42.9 (3.5)	42.4 (3.8)	42.9 (4.4)	0.69	0.001	0.267
	2	40.5 (3.7)	41.1 (3.8)	42.2 (4.2)			
Evening (15:00–23:00)	1	45.1 (4.6)	45.6 (5.1)	44.7 (5.9)	0.739	0.001	0.291
	2	47.3 (4.9)	46.5 (4.5)	45.6 (5.3)			
Night (23:00–07:00)	1	12.0 (2.6)	12.0 (2.6)	12.4 (2.8)	0.963	0.6	0.775
	2	12.2 (2.9)	12.4 (3.0)	12.3 (3.1)			
In-hospital admissions (%)	1	32.1 (2.8)	32.9 (2.3)	33.4 (2.2)	0.329	0.145	0.015
	2	32.9 (2.2)	34.4 (2.9)	32.2 (2.3)			

*Year: 1 = the year before OCL, 2 = the year of OCL
**Mean daily persent (SD)
***Time of visit grouped according to times of nurses' shifts

the hospitals that will receive injured patients [1]. During OCL, the main changes in staff management in our facility included increasing the number of physicians in the ED, especially surgeons, and increasing the number of nurses in the ED (by 20% in the evening shift and 100% in the night shift) as well as hospital orderlies. In addition, soldiers not participating in combat were recruited to assist in the hospital (mostly helping the hospital orderlies). During such periods the utilization of emergency medicine services might be affected by three main factors:

- *Changes in the regular patterns of ED visits*. These can be predicted from calendar variables, e.g., the day of the week, holidays, months, and seasons [10,11]. In addition, a relation was reported with the weather and with air pollution levels [12-14]
- *Extent of injuries in the population*. Emergency department visits depend largely on the type of event and include physical and mental trauma of various degrees of severity [1,15,16]
- *Residents' utilization of emergency medical services that were not directly hurt by the crisis*. Studies have shown that such patterns of behavior differ during a crisis [1,4-6].

In the current study we found that the daily number of ED visits decreased during Operation Cast Lead compared with the reference periods. These findings are consistent with two studies reporting a decrease in ED visits during periods of crisis (e.g., the Gulf War in Israel, 2 August 1990 to 28 February 1991, and Hurricane Isabel in the United States, 6–19 September 2003) [4,6]. The potential causes were residents fleeing to safer regions, reduction in routine everyday activities, and longer stay in safer shelters. Furthermore, it seems that routine patients are less motivated to report to the

Table 3. Characteristics of ED visits according to the study periods and type of ED

		Period			*P*		
	Year*	Before OCL	During OCL	After OCL	Between periods	Between years	Interaction
Daily no. of visits (mean, SD)							
Internal Medicine ED	1	149.1 (29.9)	149.4 (29.7)	160.9 (26.4)	< 0.001	0.081	0.028
	2	144.0 (25.5)	126.7 (28.8)	152.0 (28.5)			
Surgical/ Orthopedic ED	1	147.7 (26.4)	145.9 (28.3)	136.6 (23.3)	0.048	0.156	< 0.001
	2	146.4 (27.3)	121.0 (24.3)	145.4 (21.0)			
Pediatric ED	1	96.5 (14.7)	94.7 (14.2)	99.3 (14.0)	0.33	0.003	< 0.001
	2	109.1 (17.1)	82.4 (19.7)	92.1 (15.1)			
Obstetrics ED	1	61.3 (14.6)	63.4 (13.2)	61.5 (12.6)	0.401	0.632	0.017
	2	67.5 (11.4)	58.7 (13.6)	63.9 (11.3)			
COMMON CHIEF COMPLAINTS (%)**							
Internal Medicine ED							
Weakness, dizziness, syncope	1	20.3 (4.9)	21.1 (4.5)	21.5 (3.3)	0.63	0.066	0.821
	2	19.5 (3.6)	19.2 (3.7)	20.0 (4.7)			
Chest pain	1	17.3 (3.4)	17.2 (4.0)	16.9 (3.2)	0.586	0.665	0.523
	2	16.2 (3.1)	17.8 (4.6)	16.5 (3.4)			
Shortness of breath	1	12.6 (2.6)	14.4 (2.4)	13.8 (2.9)	0.025	0.623	0.981
	2	12.7 (2.9)	14.7 (4.0)	14.1 (2.8)			
Surgical/Orthopedic ED							
Fall	1	19.6 (5.3)	19.4 (4.8)	19.2 (4.7)	0.332	0.096	0.082
	2	16.0 (4.7)	18.0 (5.3)	20.1 (5.6)			
Limb injury	1	16.1 (3.8)	13.2 (2.9)	13.3 (3.1)	0.296	0.001	0.004
	2	15.5 (4.6)	18.4 (5.5)	15.8 (3.4)			
Motor vehicle accident	1	9.3 (2.9)	11.8 (4.5)	10.8 (4.5)	0.819	0.047	0.006
	2	10.3 (4.1)	9.2 (4.0)	9.7 (3.9)			
Work-related injuries	1	9.3 (3.8)	7.7 (2.4)	7.2 (2.7)	0.045	0.141	0.875
	2	10.2 (4.2)	9.1 (5.7)	7.7 (3.3)			
Pediatric ED							
Fever	1	21.9 (3.0)	24.6 (4.6)	25.2 (6.6)	0.147	0.003	0.414
	2	20.8 (4.0)	20.9 (5.5)	22.1 (5.5)			
Shortness of breath	1	16.3 (4.7)	19.0 (6.9)	17.1 (5.2)	< 0.001	0.525	0.04
	2	15.7 (3.6)	22.4 (4.9)	15.9 (2.7)			
Abdominal pain	1	14.6 (3.3)	12.8 (2.8)	11.3 (3.3)	0.001	< 0.001	0.68
	2	17.8 (3.9)	15.3 (4.3)	15.3 (4.6)			
Vomiting and nausea	1	8.1 (2.6)	5.8 (2.3)	6.3 (2.4)	< 0.001	0.002	0.071
	2	11.4 (3.4)	7.3 (3.9)	6.6 (2.8)			
Fall	1	5.5 (2.4)	4.0 (2.2)	3.8 (1.9)	0.4	0.327	0.096
	2	4.6 (2.2)	5.1 (2.9)	4.9 (2.7)			
IN-HOSPITAL ADMISSIONS (%)							
Internal Medicine ED	1	46.0 (4.3)	47.6 (4.1)	47.7 (3.7)	0.079	0.211	0.057
	2	47.6 (3.6)	50.1 (5.3)	46.2 (4.4)			
Surgical/ Orthopedic ED	1	10.6 (2.9)	11.6 (3.0)	10.3 (2.7)	0.454	0.153	0.381
	2	11.0 (2.5)	11.6 (3.1)	11.8 (2.4)			
Pediatric ED	1	34.4 (6.5)	34.1 (5.6)	32.7 (6.7)	0.224	0.4	0.835
	2	35.1 (3.8)	35.9 (7.2)	32.9 (6.2)			
Obstetrics ED	1	70.0 (6.0)	65.9 (7.2)	70.0 (8.6)	0.873	0.061	0.02
	2	65.4 (8.5)	68.2 (7.5)	66.2 (9.0)			
ADDITIONAL CHARACTERISTICS OF OBSTETRICS ED							
Births (%)***	1	55.3 (7.0)	53.0 (8.5)	55.6(10.7)	0.923	0.052	0.069
	2	52.2 (8.0)	54.3 (8.1)	50.3 (8.8)			
Gestational age at birth (wks) (%)							
≤ 36	1	7.3 (4.4)	10.2 (6.6)	7.0 (4.3)	0.516	0.144	0.007
	2	11.8 (4.4)	7.7 (4.8)	9.4 (5.7)			
37–41	1	90.1 (4.7)	85.9 (8.2)	88.1 (5.6)	0.793	0.157	0.003
	2	83.7 (4.8)	88.7 (5.5)	87.4 (5.6)			
≥ 42	1	2.7 (3.1)	3.8 (5.2)	4.8 (3.7)	0.862	0.935	0.072
	2	4.6 (2.7)	3.7 (3.1)	3.3 (2.8)			

* Year 1 = year before OCL, 2 = year of OCL
** Mean daily percent (SD)
*** Mean daily percent among visits in the Obstetrics ED

ED than patients who were injured (physically or with acute anxiety reactions) in warfare or disasters. Hence, visits during such periods tend to be more urgent than of the walk-in clinic type [4-6].

These findings can help in future planning and optimization of the use of human and other resources during periods of crisis, both military and non-military. The reduction in routine ED visits during such periods possibly allows shifting more resources towards injuries directly related to the crisis, both in-hospital and in the pre-hospital setting.

Another important finding of this study was the reduction in the number of patients referred to the ED by community physicians. It is worth noting that there was no change in the percentage of this type of admission out of all ED visits compared with the control periods. It is possible that the lower number of referrals to the ED results from the lower rate of visits to the community practices as previously reported [2]. However, it is possible that the community physicians assumed that the emergency departments were over-stressed and thus tended to refer fewer patients during that period. The increase in the rate of transports by ambulances may have been due to more severe conditions admitted to the ED or to patients' fears of leaving the shelters by themselves and preferring the more efficient ambulances. Such procrastination can result in exacerbation of the patient's condition and further contributes to more severe cases necessitating evacuation by an ambulance.

Exploring the age distribution among ED visitors we found a significant decrease in the rate in the 6–18 year group (school age) and an increase in the 19–65 year group (employment age). A possible explanation is the decrease in the risk of injury and reduced exposure to infections by children during the military operation, resulting from a decrease in the time spent outdoors and in school where they would be exposed to accidents and infections [6].

Assessment of the complaints and the reasons bringing patients to the ED during OCL demonstrated a reduction in the rate of visits due to motor vehicle accidents, which is in agreement with the findings of Richter et al. during the Persian Gulf War [8]. This could be explained by less crowded roads, a decrease in public and social gatherings and hence in alcohol-related crashes [8,17]. Nevertheless, travel speeds, crash impacts, and kinetic energy delivered to victims were reported to be higher during war [8]. In addition, a higher rate of dyspnea in the pediatric population and of limb traumatic injury was found during the period of the operation. No other significant changes were found in the major complaints of ED patients during this period. Evaluation of the severity or the urgency of the cases presenting to the ED during the operation was not performed in this study. However, a higher rate of hospital admissions from the Internal Medicine and Obstetrics ED could imply more severe and urgent cases presented during OCL in accordance with the report by Ben-Nun et al. [6]. A study of the types of complaints and the severity of the medical conditions presenting to the ED during crisis periods is warranted.

Interestingly, the number of births at Soroka did not change during OCL despite the possibility of women choosing a hospital further from the zone being bombarded. Moreover, the rate of premature births (32–26 weeks) decreased during the operation, while that of term births increased, compared to the period before the operation. This finding is in opposition to previous reports suggesting an association between stress and increased risk of premature labor [18,19], yet it is consistent with previous reports during wars in Israel [20,21]. The possible explanations suggested by the investigators were increased support for the pregnant women by the surrounding society and a reduction in sexual activity due to the recruitment of the men [21]. Further study evaluating the characteristics of the deliveries during a crisis and especially war periods, including additional factors, should be conducted [22].

LIMITATIONS

First was the inability to evaluate the number of citizens who temporarily migrated to safer regions out of the missile range. This could have affected the number of ED visits. Second, when comparing chief complaints we did not include medical diagnoses (e.g., myocardial infarction). It is highly probable that the risk for several diagnoses (e.g., myocardial infarction) is increased during such stressful periods, yet based on the definitions used here these diagnoses would be considered "routine" in most cases. Hence, we advocate further study to better understand the effect of warfare on incidence-specific medical conditions, especially those that are stress-related. Third, we did not include an evaluation of the number and types of visits to the community clinics, which are usually the first address for most patients, and only included the number and type of referrals to the ED by community doctors. Furthermore, we did not evaluate the trends in other remote or nearby hospitals. Further studies evaluating community medical services and other remote or nearby hospitals should be undertaken to better characterize and understand the changes and causes of different patterns seen in hospitals, and in patient and community physician behavior related to utilization of medical services during a period of warfare.

CONCLUSIONS

It is extremely important to explore the patterns of utilization of emergency medical services during crises by populations not directly related to the events ("routine" medicine). This study shows that throughout Operation Cast Lead the num-

ber of routine ED visits decreased significantly compared to the control periods. These findings could help to optimize the utilization of hospital and out-of-hospital human resources and support a more prudent and efficient use of the medical systems during periods of similar crises.

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