

## Injury as a Result of Violence in Israel

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### Abstract

**Background:** The Israeli society seems to have become more violent in recent years. This study explores trends in violence related injuries and characterizes the population injured by violence, with the aim of confirming this claim.

**Methods:** The study was based on data from the Israeli National Trauma Registry between 1997 and 2003. It consisted of 117,036 patient records of which 6,701 (5.7%) sustained violence related injury. Various parameters were described and compared between 'violence related injuries' and other injuries as well as within different sub groups of 'violence related injuries'. Multiple logistic regression analysis was used to explore the relationship between violence related injury percents and age, gender and population group.

**Results:** The proportion of violence related injuries (among all injuries recorded in the Trauma Registry) significantly increased during the period analyzed (from 5.1% in 1997 to 6.7% in 2003), however, the increase was significant among males only ( $P < 0.0001$ ). Violence related injuries occurring in the street, at night (23:00-06:59) and over the weekend significantly increased during the period analyzed ( $P < 0.0001$  for all). The risk of being hospitalized because of violence related injury (relative to being hospitalized due to non-violence related injuries) was 2.9 times (CI -2.68-3.14) higher among males as compared with females, 1.7 times (CI -1.62-1.83) higher among non-Jewish Israeli residents and 1.2 times (CI -1.05-1.39) higher among foreign workers than among Jewish Israeli residents.

**Conclusions:** The extent of violent crime has significantly increased over the period studied and was most evident among males and among non-Jewish Israeli residents.

**MeSH Words:** violence; injury; Israeli trauma registry

### Introduction

Violent crime in Israel is on the rise and has become a vital issue that needs to be addressed. Reports of violent crimes including murder, stabbing, rape, child abuse, and others are often on the daily news. Understanding the extent of

the phenomena and learning who is at risk of being injured by violence is essential for addressing the problem. The current study will provide an insight into the trends and characteristics of violence related injuries in the Israeli society.

Israeli police data on crime show that the Israeli society has developed into a more aggressive society (1). According to these data, the overall number of severe and organized crime cases (including: murder or attempted murder, assault, robbery, gambling, bribe, drug abuse, blackmail and others), has increased from 20,561 cases in 1997 to 26,024 cases in 2003, a 26.6% increase. Violent crime rates in western societies such as the U.S.A, England and Canada, have decreased in recent years. According to a U.S Bureau of Justice Statistics report (2,3), per capita violent crime rates (for ages 12 and over) have declined since 1994 and reached the lowest level ever in 2003. Per capita violent incident rates have decreased throughout most of the 1990's in Canada as well (4). British crime survey data show that the number of violent offences has decreased by 35% between 1995 and 2003 (5).

Reports on juvenile (ages 12-18) crime in Israel are inconsistent; Police data show that between 1994 and 2002 there was a sharp increase both in the overall number of juvenile crime cases and in the number of juvenile violence cases (6). The results of a survey conducted in 2002 among 6,196 6<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> grade students in Israel show that the proportions of students involved in a violent event (either as a victim or as a victimizer) in school in 2002 were lower than the proportions found in 1994 and in 1998 (7). According to this study, 51.6% of all Jewish students in the survey reported being victimized by violence in 1994 as compared with 47% in 1998 and 40.1% in 2002.

### **Aim**

This study set out to explore evidence from national trauma registry data for the claim that the Israeli society is becoming more violent, to describe violence related injuries in Israel between 1997 and 2003 and to identify target areas for intervention by characterizing populations at high risk for violence related injuries.

### **Objectives**

- To check whether the proportion of violence related injuries among all injuries recorded in the Israeli National Trauma Registry has increased from 1997 to 2003.

- To characterize the population injured by violence in order to identify areas for intervention and prevention.
- To compare the population injured by violence to the population injured by other causes.

### **Methods**

#### *Data source and inclusion criteria*

This study is based on data from eight trauma centers (all 6 level I trauma centers and two regional centers in Israel) participating in the Israeli National Trauma Registry between 1/1/1997 and 31/12/2003. The Trauma Registry consists of all injured individuals who arrived at the hospital up to 72 hours after the injury and were either admitted to the hospital, died in the hospital (including deaths occurring in the emergency department) or were transferred to another hospital for admission. The trauma registry does not include injuries resulting from poisoning, drowning and suffocation, patients discharged from the hospital after treatment in the emergency room, injured individuals declared dead before arriving at the emergency room and injured individuals that arrived at the emergency room 72 hours or more after injury. Violence victims were defined as such by their external cause of injury (ICD-9-CM Ecodes E960-E968) (8).

#### *Scope of data and statistical analysis*

Statistical analyses included: comparisons of frequency distribution between 'violence related injuries' and all other injuries as well as within different sub groups of 'violence related injuries'. Among the parameters analyzed were: age, gender, population group, injury circumstances, severity and hospitalization characteristics. Trends in various variables were compared between 'violence related injuries' and all other injuries as well as within different sub groups of 'violence related injuries'.

Multivariate logistic regression analysis was used to analyze the relationship between violence related injuries (among all injuries in the registry) gender, age and nationality. The response variable was the cause of injury (violence/non-violence), the explanatory variables were: age (divided into 10 year categories), gender and nationality (Jewish

Israeli resident / non Jewish Israeli resident / foreign worker). Due to the small number of violence related injuries in the 0-9 age group the 10-19 age group was used as the inference group in this analysis (subjects in the 0-9 age group were not included in the analysis).

Statistical analyses were performed using SAS software. Statistical significance was set at  $P < 0.05$  for all analyses. ICD-9-CM (8) was used to code Injury types and diagnoses.

## Results

The study population consisted of 117,036 patient records of which 6,701 (5.7%) sustained violence related injury (Table 1). Males constituted 87.1% of all violence related casualties and 61.6% of all non violence related injuries. Over 50% of all violence related casualties were aged 10-29 years.

A sharp increase in both the number and percent of violence related injuries was seen at the young ages and up to age 20 (Figure 1). An analysis of violence related injury percents by gender and by age group revealed that violence related injury percents increased up to age 39 and then decreased for both males and females. Furthermore, violence related injury percents were 2-3.5 times higher for males than for females at every age group. Among all Jewish Israeli resident injuries in the Trauma registry, 4.8% were violence related injuries, compared with 8.5% of violence related injuries among all non - Jewish Israeli residents and 12.4% of violence related injuries among all foreign workers (please note that the number of foreign workers in the trauma registry was very small throughout the period analyzed).

As shown in Table 1, compared to other injury causes, a larger part of violence related injuries occurred at night (between 23:00 at night and 06:59 in the morning, 35.3% vs. 13%), over the weekend (Friday and Saturday, 36.3% vs. 27.3%), in leisure places (24.9% vs. 5.0%) and in the street (39.4% vs. 34.9%). Only 14% of all violence related injuries occurred at home as compared with 34.7% of injuries due to other causes.

Most violence related injuries were caused by stabbing (40.6%) and by unarmed fight (33.9%). Firearm injuries constituted 8.3% of all violence

related injuries, 26% of all severe violence related injuries and 8.6% of all violence related deaths.

Violence related injury percents significantly increased over the period analyzed (from 5.1% in 1997 to 6.7% in 2003,  $P < 0.0001$ ) with a relatively sharp increase between 2001 and 2002 (Figure 2). The increase was significant among males only, at night (23:00-06:59), over the weekend and in the street ( $P < 0.0001$  for all). Violence related injuries occurring at home significantly declined over the years ( $P = 0.008$ ). Significant increasing trends were also seen among violence related injuries caused by stabbing, unarmed fight and by firearm ( $P < 0.0001$  for stabbing and unarmed fight,  $P = 0.0002$  for firearm).

The results of the multivariate logistic regression analysis are presented in Table 2. According to these results, the risk of being hospitalized because of a violence related injury (relative to being hospitalized due to a non-violence related injury) is 2.9 times higher among men as compared with women (CI - 2.68-3.14), 1.7 times higher among non-Jewish Israeli residents (CI - 1.62-1.83) and 1.2 times higher among foreign workers than among Jewish Israeli residents (CI - 1.05-1.39). The risk of being hospitalized due to violence related injury increased up to age 39 and was 1.6 times higher at ages 20-29 (CI - 1.46-1.69) and 1.7 times higher at ages 30-39 (CI - 1.52-1.79) as compared with the risk at ages 10-19.

## Discussion

The results of this study show that violence related injury in Israel has become significantly more common over the past 7 years while violence crime rates in other western societies have decreased over the same period. According to the World Health Organization (WHO) it is mostly young men that are involved in and injured by violence (9). As was shown in a recent WHO report, the world's interpersonal violence mortality rates in the year 2000 were 2.2-4.4 times higher among males than among females ages 15 and over (9). The findings of this study support this notion as was seen by the sharp increase in violence related injury percents at the early ages, by the higher proportion of males injured by violence as compared with

females and by the significant increasing trend in violence related injury percents among males only.

Significant increases in violence related injury percents were seen among those injured over the weekend (48 hours, Friday and Saturday), among those injured during late night-early morning hours and among injuries occurring in the street. As compared with other injury causes, a larger part of violence related injuries occurred on Friday and on Saturday. A high proportion of all violence related injuries occurred in trade/leisure places. These findings are consistent with the latest trend in lifestyle and adolescents' leisure habits which mostly occur on weekend nights. The tendency of being involved in a violent incident at night in leisure places such as a pub or night club may be augmented by fatigue, alcohol consumption and possibly by peer pressure.

A worrying finding of this study is that not only has the Israeli society become more violent but a higher percent of violence related injuries are caused by the more severe types of violence such as stabbing and firearms. There is evidence to suggest that the availability of firearm increases the risk of homicide, suicide and unintentional gun injuries (10). Similarly, it is possible that the possession of licensed firearm for security purposes in Israel has an effect on the risk of injury of people within the Israeli society. A report that explored the effects of the latest Palestinian uprising on both Jewish and Palestinian women showed that between 10/2000 and 4/2005, 38 women were killed by firearm by their spouses or other family members whereas during the 4 years previous the uprising only 14 women were killed by firearm. Furthermore, 47% of the women killed during the uprising were killed by security guard, soldiers and policeman spouses possessing licensed firearm (11).

The increase in violence related injury percents over the years may partly be attributable to the stressed atmosphere in Israel. Frequent exposures to terrorism and hostility as well as economic instabilities have been a part of the Israeli experience for most of its existence and inevitably contributed to that atmosphere. Exposure to violence (direct or indirect) and traumatic symptoms such as anxiety, depression, fear, anger and post traumatic stress have an

effect on violence and are correlated with violence (12,13,14). A study assessing health behavior in school aged children in Israel in 2002 showed that one in every 3-4 students reported living in a life threatening fear related to the security situation although only 13% of them were in the vicinity of a terror incident or were injured in such an incident (7). In another study, conducted in the U.S.A. several days after the September 11 terrorist attack found a strong correlation between the extent (number of hours) of television viewing of the attack coverage and stress reactions among U.S. adults (15).

Economy state affect crime rates as well (16,17). Studies show that violence death rates are highest in middle income countries with great social heterogeneity; Israel is a middle income country with intense exposure to terror. The combined effects of both the economy and terror on crime almost make Israel a natural habitat for criminal activity.

Demographic changes including those associated with the immigration from the Soviet Union and Ethiopia in the Israeli society may have contributed to the increase in violence related injury percents over the years. Reports show increased juvenile crime rates among immigrants in Israel (1,18). According to Israeli police report the number of immigrant police reports rose by 10% in 2003 as compared to 2002 (1). Involvement in criminal activity among former USSR youths in Israel rose from 13.6% in 1991 to 22.5% in 1996 (18). The immigration process is long and involves great difficulties due to changes in the social, economic and professional status, communication problems and mentality and cultural differences. Language difficulties among juvenile immigrants lead to high drop out rates from the education system. The changes associated with the immigration process inevitably contribute to behavioral changes in general and to violence in particular.

The data analyzed and presented in this study refer to those individuals injured by violence rather than to those responsible for causing the injury, unless they were injured and admitted to the hospital themselves. Furthermore, the extent of violence related injuries may be underestimated due to underreporting by those injured (for example in the case of family violence). The data presented in this study is therefore representative of violence related

**Table 1:** Demographic characteristics, injury site and time, violence related injuries vs. all other injuries in the trauma registry

Variables	Violence		Other	
	N	%*	N	%*
All injuries in TR	6701	5.7	110335	94.3
<b>Sex</b>				
Males	5837	87.1	67958	61.6
Females	860	12.8	42330	38.4
<b>Age group</b>				
0-9	215	3.2	27180	24.6
10-19	1403	20.9	15500	14.1
20-29	2115	31.6	14991	13.6
30-39	1405	21.0	9524	8.6
40-49	789	11.8	8157	7.4
+50	700	10.5	34473	31.2
<b>Nationality</b>				
Jewish	4292	64.1	85589	77.6
Non Jewish	1966	29.3	21074	19.1
Foreign worker	260	3.9	1835	1.7
<b>Injury site</b>				
Street / road	2640	39.4	38474	34.9
Home	939	14.0	38300	34.7
Leisure places	1667	24.9	5487	5.0
Other	1455	21.7	28074	25.5
<b>Weekday</b>				
Week end	2433	36.3	30107	27.3
Mid week	4268	63.7	80228	72.7
<b>Day time</b>				
23:00-06:59	2365	35.3	14323	13.0
Other	4301	64.2	95213	86.3

## Conclusions

The proportion of violence related injuries (among all injuries recorded in the Israeli National Trauma Registry) has indeed increased (by 31%) between 1997 and 2003. The increase was significant particularly among young males. Proportions of violence related injuries were higher among non-Jewish Israeli residents

throughout the period analyzed. A significant increase in injuries caused by the more severe types of violence (such as stabbing and firearm) was noted as well.

The fact that injuries caused by violence in general and by the more severe types of violence

in particular have increased in Israel during the period analyzed, while crime rates in other western societies have decreased during the same period should alert public health authorities and decision makers. The data presented in this

study points to an urgent need for prioritizing violence prevention and intervention programs. Such programs should be partly based on programs that were successful in reducing violence in other societies.

\*Values may not add to 100% due to missing data

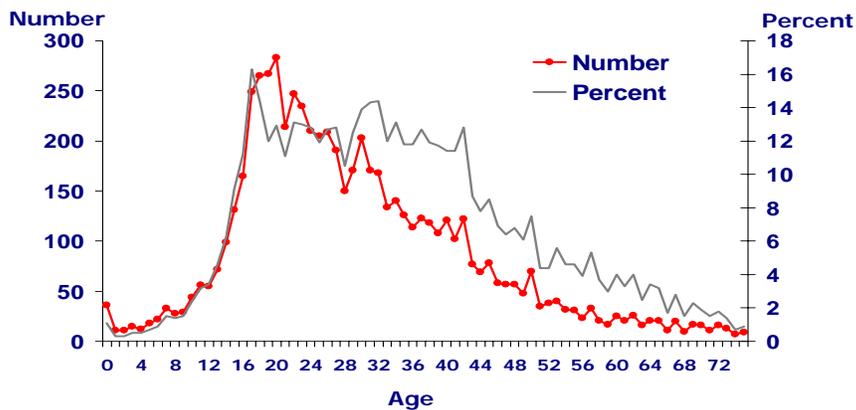
**Table 2:** Risk of being hospitalized because of violence related injury, results of the multivariate logistic regression analysis

Variable	Percent*	Adjusted odds ratio	95% CI
<b>Gender</b>			
Female	12.4	1.00	--
Male	87.6	2.90	2.68-3.14
<b>Age group</b>			
10-19	22.1	1.00	--
20-29	33.3	1.57	1.46-1.69
30-39	21.4	1.65	1.52-1.79
40-49	12.3	1.17	1.07-1.29
+50	10.9	0.35	0.32-0.38
<b>Nationality</b>			
Jewish Israeli resident	66.3	1.00	--
Non-Jewish Israeli resident	29.9	1.72	1.62-1,83
Foreign worker **	3.8	1.21	1.05-1.39

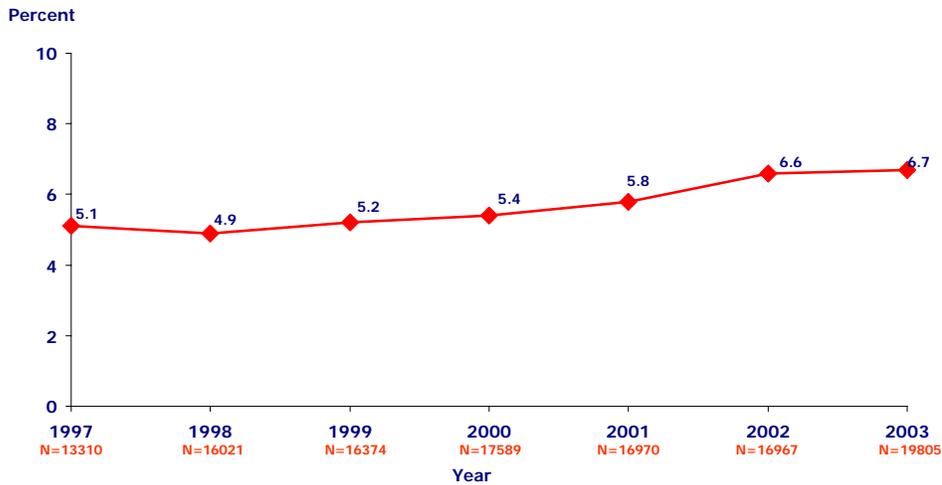
\*Percents out of all violence related injuries aged 10 and over with no missing values for gender and nationality (N=6,250).

\*\*Please note that the number of foreign workers in the trauma registry were very small throughout the period analyzed.

**Figure 1:** Number and percent of violence related injuries by age



**Figure 2: Percents of violence related injuries (out of all injuries in the trauma registry) between 1997 and 2003**



## References

1. Israeli police. Crime in Israel – A full statistical report. Available at: [http://www.police.gov.il/statistica\\_umipui/statistica/2003\\_crime/report.pdf](http://www.police.gov.il/statistica_umipui/statistica/2003_crime/report.pdf). Accessed September 01, 2005. (In Hebrew).
2. Federal Bureau of Investigation. Crime in the United States | 2003. Uniform Crime Reports. Available at: <http://www.fbi.gov/ucr/cius03/pdf/toc03.pdf>. Accessed December 05, 2004.
3. Bureau of Justice Statistics. Crime and Victims Statistics. 2004. Available at: <http://www.ojp.usdoj.gov/bjs/glance>. Accessed December 19, 2004.
4. Statistics Canada. Canadian Statistics – Crime by Type of Offence. Available at: <http://www.statcan.ca/english/Pgdb>. Accessed December 05, 2004.
5. Home Office. Crime Statistics for England and Wales – The British Crime Survey. Available at:
6. Bloch S. Juvenile criminality: the current state and methods of coping by the Israeli police. Available at: [http://www.polic.gov.il/pdf/avaryanut\\_noar.pdf](http://www.polic.gov.il/pdf/avaryanut_noar.pdf). Accessed September 01, 2005. (In Hebrew).
7. Harel Y, Molcho M, Tillinger E. Youth in Israel. Health, well-being and risk behavior. Summary of findings from the third national study (2002) and trend analysis (1994-2002). Health behaviors in school aged children (HBSC): A World Health Organization cross-national study. Ramat Gan: Bar Ilan University; 2003.
8. Supplementary classification of external causes of injury and poisoning (E800-E999). In: Puckett CD, ed. *The educational annotation of ICD-9-CM. 4<sup>th</sup> ed.* Reno, Nevada: Channel publishing; 1994: 1061-1124.
9. World Health Organization. The injury chart book: a graphical overview of the global burden of injuries. Available at: <http://www.whqlibdoc.who.int/publications/924256220x.pdf>. Accessed March 3, 2005.

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10. Society for adolescent medicine. Adolescents and firearms. Position paper of the society for adolescent medicine. *J Adol Health*. 1998; 23:117-118.

11. Sinai R. Forty seven percent of women murderers in the family are security guards or security personnel. Available at: <http://www.haaretz.co.il/hasite/objects/pages/PrintArticle.jhtml?itemNo=650648>. Accessed December 04, 2005. (Article in Hebrew).

12. Wiener Z. Individual and societal reactions to ongoing terror in Israel. Available at: [http://www.johannes-wier.nl/downloads/paper\\_wiener.pdf](http://www.johannes-wier.nl/downloads/paper_wiener.pdf). Accessed December 05, 2004.

13. DuRant RH, Cadenhead C, Pendergrast RA, Slavens G, Linder CW. Factors associated with the use of violence among urban black adolescents. *Am J Public Health* 1994; 84:612-617.

14. Song LY, Singer MI, Anglin TM. Violence exposure and emotional trauma as contributors to adolescents' violent behaviors. *Arch pediatr adolesc med* 1998; 152:531-536.

15. Schuster MA, Stein BD, Jaycox LH, Collins RL, Marshall GN, Elliot MN et al. A national survey of stress reactions after the September 11, 2001, terrorist attack. *N Engl J Med* 2001; 345:1507-1512.

16. Andrienko Y. Crime and wealth: Evidence from international crime victim surveys. Available at: <http://www.cepr.org/meets/wkcn/7/756/papers/andrienko.pdf>. Accessed January 30, 2005.

17. Fanzylber P, Lederman D, Loayza N. What causes violent crime? Available at: [http://econ.worldbank.org/files/15756\\_FajnzylberetalCrimeCauses.PDF](http://econ.worldbank.org/files/15756_FajnzylberetalCrimeCauses.PDF). Accessed January 30, 2005.

18. Sherer M, Etgale T. Attitudes toward sex and sex offences among Israeli and former Union of Soviet Socialist Republic youth: implication for prevention strategies for new immigrants. *J interpers Violence* 2005; 20:680-700.

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