

A burn prevention program as a long-term investment: trends in burn injuries among Jews and Bedouin children in Israel

E. Shani^{a,*}, S.A. Bahar-Fuchs^a, I. Abu-Hammad^a, M. Friger^a, L. Rosenberg^{a, b}

^a*The Center for Research and Development of Advanced Studies in Plastic Surgery, The Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel.*

^b*Plastic Surgery Burn Unit, Soroka Medical Center, P.O. Box 151, Beer-Sheva, Israel.*

Accepted 20 April 1999

Abstract

In order to broaden our long-term intervention efforts in elementary schools in Israel (underway since 1988) and to set priorities for further population-specific actions, we compared the pattern of burn injuries among two age groups (0–4; 5–14) of two ethnic groups of Jews and Bedouins admitted to a regional hospital between 1986 and 1995 ($n = 1050$). The findings indicated a significant downward trend, though somewhat nonlinear, in burn admissions among the older age groups. A relatively less favorable trend was observed for the younger age groups. Consistently across years, burn rates in the younger group of Bedouin children were the highest.

For the 10-year period, a significant season by ethnic group variation in burn admissions was observed, with a peak in the spring and in the wintertime for the Jews and Bedouins, respectively. A significant trend of decrease, mostly among older children, in average lengths of hospital stay, was also evident. Yet, regardless of age group and across years, Bedouin children stayed longer in the hospital than Jewish children. The overall leading causes of injury (for 1992–1995) were hot liquids (69%), fire (17%), chemicals (9.5%) and contact (2%). In our view, there is a need to address at-risk populations through environmental, community and family-oriented interventions and to venture beyond the pathogenic factors to the investigation of the salutary factors of health under diverse life conditions. © 2000 Elsevier Science Ltd and ISBI. All rights reserved.

Keywords: Burn injuries; Children; Epidemiology; Prevention

1. Introduction

Home-related injuries affect all ages, but they are the most common cause of morbidity, disability and mortality among children under the age of 14 yr [1,2]. Yet, despite the impressive advances in the science of injury-control and prevention since the sixties, they have remained the ‘neglected disease of modern society’ and are still regarded by many as an act of fate and bad luck. Israel is no different than most developed countries in these respects.

Among the key injury types affecting children in Israel, burn and scalds are classified as less severe in

terms of mortality and hospital admission rates. However, children with burns stay longer in hospitals compared to those with any other injury [3] and their suffering, severe disfigurement for life and continuous emotional stress disorders demand special attention [4].

The magnitude of the economic costs associated with this health problem is also immense. According to the Division of Injury Control [5], the annual costs for burned children in the United States amount to US\$3.6 billion per year. In Israel, the estimated costs per one patient with an extensive burn (95% TBSA), based on the length of stay in the hospital, amount to US\$141,750, only 37.5% of which is salaries [6]. The true extent of the financial burden associated with the long rehabilitation process is unknown.

Without doubt, in the absence of medical preventive

* Corresponding author. Fax: +972-7-6403033.

E-mail address: eshani@bgumail.bgu.ac.il (E. Shani).

measures, educating children and their supervisors in injury-control and home-related safety skills could play a major role in promoting their health and well-being [7]. Since 1986, our university center has taken the lead in Israel in the area of home-related injuries and burn prevention. Focusing on elementary school children, a school-based program was developed and in 1988 it was partially adopted by the Ministry of Education and the national service volunteer associations. The program design and the classroom procedures, as well as the evaluation studies conducted over a 2-year period (1986–1987), were described elsewhere [8]. To summarize briefly, the program is based on the social learning [9] and information processing [10] theories. The multilevel classroom activities, administered by national service volunteers (girls' ages 18–20 yr), include visual information, safety-skill training and risk-control activities. The evaluation studies revealed significant improvements in children's injury-control knowledge and attitudes. Both teachers and principals assessed the program as important and effective and the in-training workshops won high approval. A downward trend in overall admission rates to our regional medical center (Soroka) since 1982 was also found.

More recent estimates of annual burn incidence and medical care use in the United States [11], as well as in Scotland [12], Finland [13] and Canada [14], have also indicated significant declines in each estimate since 1970. It was suggested that the positive trend reflects the beneficial effects of widespread educational efforts, regulations of consumer products, changes in home cooking practices and societal change regarding health and health promotion activities. It also reflects a shift in treatment from inpatient to outpatient settings and the overall sharp decline in hospital admissions.

However, with few exceptions [15], there is still a marked prevalence of burn injuries among the 0–4 yr old group [16,17]. With no exception the socio-economic and ethnic gradient in injury mortality and morbidity rates, as well as in almost every disease and condition, persists across societies and health care systems [18,19]. A relevant report from the United States [5] provided evidence that injuries in the pediatric population disproportionately affect black, nonblack minority children and children who live in rural areas. Mortality data show that the death rates of black children are 1.3–2 times the rates for whites of all age and sex groups. A similar pattern was evident in New Zealand among children of Maori and Polynesian descent [20], in India among children from large, low socio-economic families living in crowded conditions [21] and in Israel among the non-Jewish population groups [22]. According to the National Council of Child Welfare [2], mortality rates due to injuries (MVA not included) for non-Jewish children ages 0–4

yr are 2.6 times the rate for the Jewish population and for children ages 5–14 yr the rates are 1.7 times higher. The ethnosocial-health gradient was also ubiquitous in our epidemiological survey for the years 1982–1983 [23], indicating that the overall burn-related rates of admissions to the Soroka Medical Center for the non-Jewish population of Bedouins (Israeli Muslims) were three times the rate for the Jewish population.

According to the Statistical Yearbook of the Negev [24], the Soroka University Medical Center, the only regional referral hospital, located in the capital city of the Negev (Hebrew word for desert) region — Beer-Sheva, serves approximately 340,000 Jewish residents and 108,000 Bedouins. This tribal population of Bedouins has undergone a rapid process of transition in the last two decades from a nomadic and seminomadic lifestyle to urban settlement. However, due to the transition process and its effect on the Bedouins' lifestyle and based on their level of education (median years of schooling is 8.0 for males and 0.7 for women), occupational status (81.7% of the employed are blue collar workers) and the estimate that almost 40% still live in seminomadic conditions [25–27], most of the Bedouins may be classified as a low SES ethnic group. They are thus at high risk for diverse health problems beginning at the earliest stages of life.

Within our Center's limited resources, special effort has been made to implement the prevention program among Bedouin children in the past few years. Since 1990, over 20,000 elementary school children and 1900 teachers have been exposed to our burn prevention messages. In 1998 the teachers' guidebook was translated into Arabic by the Ministry of Education and it has also been used, though sporadically, by primary health care clinics.

However, while it was found, by one of the pediatric units in Soroka (unpublished report, 1998), that Bedouin children ages 0–2 yr old, accounted for 64% of the injury-related admissions to the unit, with burns as the second leading cause of injury, no preventive actions have been taken to reduce injuries in general and burn-related tolls in particular among infants and toddlers. Of high priority, is the need for more accurate and comparative estimates regarding the pattern, nature and severity of this pediatric health problem over time. The provision of such information is a key element in mobilizing national and local support for better-targeted and more effective burn prevention measures.

Set against this background, the aim of the present study was to compare the nature and extent of burn-related injuries among two age groups (0–4; 5–14) of two ethnic groups of Bedouin and Jews admitted to the Soroka Medical Center during the period of 1986–1995.

Table 1
Biannual number of burn admissions by age group and ethnic group

	Ages 0–4 (yr)				Ages 5–14 (yr)			
	Jews (<i>n</i>)	Jews (%)	Bedouins (<i>n</i>)	Bedouins (%)	Jews (<i>n</i>)	Jews (%)	Bedouins (<i>n</i>)	Bedouins (%)
1986–1987	66	23.9	95	19.7	37	23.9	33	23.9
1988–1989	40	14.5	60	12.5	26	16.8	24	17.4
1990–1991	59	21.4	122	25.4	28	18.1	30	21.7
1992–1993	55	19.9	89	18.5	35	22.6	26	18.8
1994–1995	56	20.3	115	23.9	29	18.7	25	18.1
	276	100	481	100	155	100	138	100

2. Material and methods

The source of data for this study, covering the period between January, 1986 to December, 1995, was obtained from the in-patients' computerized medical data of Kupat Holim (Sick Fund) Klallit. All registrations with first, second or third-listed diagnosis related to burn and scald injuries (ICD code 940-9) and identified as either Jews or Bedouins, ages 0–14 yr, were counted. Recurrent admissions were counted as single admissions. Out of a total of 1132 children, there were 1050 children who met the inclusion criteria for this study.

Data related to month of admissions, duration of hospital stay and possible causes of injury and mortality data were also collected. However, it should be noted that no computerized data regarding causes of injury (E-codes) were available for the period prior to 1992 and no data regarding severity measures (TBSA%) were available for the whole observation period.

Data analyses, using the STATISTICA 5 and SPSS 6.1 statistical packages, involved two kinds of operations: frequency tables with categorical variables, broken down by age and ethnic group, were analyzed using the log–linear procedure [28]. This statistical procedure allows, through logarithmic transformation and via a χ^2 test, to consider the best model to fit the data (the smaller the value, the better the fit) and explain main effects, as well as simple and higher-order interaction effects. Analyses of variance (ANOVA) was performed to reflect main effects and interaction effects on continuous dependent variables. Since significant interaction effects are not often found in small or moderate-size samples [28], biannual number and rates of burn admissions were calculated. Admission rates are presented by 1000 child-years and calculations are based on the average biannual population-denominators [29]. Level of significance was set at 0.05. All *P* values are two-sided.

3. Results

3.1. Biannual number and incidence rates of burn admissions

Biannual numbers of children with burn injuries admitted to the Soroka Medical Center during the 10-year period, broken down by age group and ethnic group, are displayed in Table 1.

The log–linear analysis conducted on the number of burn admissions revealed that the best model to fit the data ($p = 46$) is the one indicating a significant main effect for year of admission ($p < 0.0001$) and a significant interaction effect for age group by ethnic group ($p < 0.0001$).

Table 2 presents the biannual rates of burn admissions by age group and ethnic group. For both Jews and Bedouins in the older age group of 5–14, an overall downward trend in burn admission rates, somewhat nonlinear, was found. A less positive and less consistent trend was observed for younger children of 0–4 yr.

Across years and in both groups, admission rates for younger children exceeded those for older children. However, with no exceptions, burn admission rates for Bedouin children exceeded those for Jewish children, reaching a peak of 3.7 times higher for the younger age group of Bedouin children in 1990–1991, compared to their Jewish counterparts.

Table 2
Biannual incidence rates of burn admissions by age group and ethnic group. Rates per 1000 child-years are presented

	Ages 0–4 (yr)		Ages 5–14 (yr)	
	Jews	Bedouins	Jews	Bedouins
1986–1987	2.23	7.36	0.70	1.68
1988–1989	1.37	4.20	0.49	1.12
1990–1991	2.03	7.53	0.50	1.30
1992–1993	1.79	4.81	0.58	1.05
1994–1995	1.77	5.48	0.46	0.91

Table 3
Seasonal number of burn admissions by age group and ethnic group (1986–1995)

	Ages 0–4 (yr)				Ages 5–14 (yr)			
	(n)	Jews (%)	Bedouins (n)	Bedouins (%)	Jews (n)	Jews (%)	Bedouins (n)	Bedouins (%)
Winter	95	34.4	134	27.8	34	21.9	42	30.4
Spring	82	29.7	131	27.2	55	35.5	36	26.1
Summer	55	20.0	96	20.0	42	27.1	34	24.6
Autumn	44	15.9	120	25.0	24	15.5	26	18.9
	276	100	481	100	155	100	138	100

3.2. Seasonal pattern of burn admissions

The seasonal pattern of the sum of burn admissions by age group and by ethnic group over the 10-year period is presented in Table 3. The log-linear analysis revealed that the best model to fit the data ($p < 0.14$) is the one indicating a significant interaction effect of age group by ethnic group ($p < 0.0001$) and a significant interaction effect of ethnic group by season ($p < 0.05$).

Regardless of season, younger Bedouin children had the highest number of burn admissions. However, above and beyond age group, a significant season by ethnic group effect on burn admissions was evident. For the Jewish children, the number of admissions tend to increase during spring months (April–June), with a marked peak in April (not shown), which is the time of the Passover festivities. Among the Bedouin children, burn injuries tend to peak during the winter season (January–March), when the cold evenings and nights in the Negev region probably demand increased use of hot beverages and [hazardous] heating measures. Both ethnic groups had relatively lower numbers of admissions during the summer months (July–September), when children spend most of their days outdoors.

Table 4
Biannual average length of hospital stay (days) by age group and ethnic group

		Ages 0–4 (yr)		Ages 5–14 (yr)	
		Jews	Bedouins	Jews	Bedouins
1986–1987	Mean	4.92	8.05	7.03	11.38
	S.D.	3.74	6.27	5.58	8.46
1988–1989	Mean	7.02	7.82	6.85	9.09
	S.D.	4.67	6.00	4.33	8.07
1990–1991	Mean	5.79	6.81	6.61	8.66
	S.D.	5.29	5.73	4.42	7.03
1992–1993	Mean	4.58	7.73	4.46	7.04
	S.D.	5.18	6.22	4.91	6.52
1994–1995	Mean	6.39	7.00	4.38	7.24
	S.D.	5.42	6.75	3.99	7.87

3.3. Biannual average length (days) of hospital stay

The biannual means and standard deviations of average length of hospital stay by age group and ethnic group are displayed in Table 4. Seven extreme cases, with an average length of stay of >40 days were excluded from the statistical analysis (4 cases of Bedouin children ages 5–14 yr in 1986–1987 and 3 cases of the same age group and ethnic group in 1990–1991).

The analysis of variance (ANOVA) revealed a significant main effect for ethnic group ($p < 0.0001$), accounted for by the longer hospital stay of Bedouin children compared to the Jewish children. A significant interaction effect of year of admission by age group on lengths of stay was also found ($p < 0.05$), accounted for by the trend of reduction in the average lengths of stay mostly among the 5–14 age group. The variation in lengths of hospital stay, observed for the younger group of 0–4, were less consistent as well as less favorable.

3.4. Causes of burn and scald-related injuries

The distribution of causes by age group and ethnic group is displayed in Table 5. Details (E-coding) were available for 72% of the cases hospitalized during the period of 1992–1995 ($n = 306$).

The data revealed that the majority of burns (69%) were caused by hot liquids, fire and flames (17%), chemicals (9.5%) and contact with hot objects (2%). The rest were caused by electricity (1%) and unknown factors, road accidents included (1.6%). Jewish children outnumbered Bedouin children in chemical and contact related burns. Younger children markedly outnumbered older children in burns caused by hot liquids and older children outnumbered younger children in fire-related burns. No fire-related burns were observed among the younger group of Jewish children, compared to 21% of injuries in this category among their Bedouin counterparts. Despite the large number of missing values, the distribution of etiologic factors found in our study is consistent, to a large extent, with the findings of others in Israel [23,30].

Table 5
Causes of burn injuries by age group and ethnic group (1992–1995)

	Ages 0–4 (yr)				Ages 5–14 (yr)				Total	
	Jews (n)	Jews (%)	Bedouins (n)	Bedouins (%)	Jews (n)	Jews (%)	Bedouins (n)	Bedouins (%)	n	%
Fire	–	–	32	20.9	11	34.4	9	30.0	52	17.0
Chemical	13	14.3	11	7.2	3	9.4	2	6.7	29	9.5
Electricity	–	–	1	0.6	–	–	2	6.7	3	1.0
Hot liquid	73	80.2	106	69.3	16	50.0	15	50.0	210	68.6
Hot object	5	5.5	2	1.3	–	–	–	–	7	2.3
Other	–	–	1	0.6	2	6.2	2	6.6	5	1.6
Total	91	100	153	100	32	100	30	100	306	

3.5. Mortality

For the present sample of children, no deaths attributed to burns were recorded. This is consistent with the overall low mortality rates of 0.5/100,000 among hospitalized burn patients in Israel [31]. The low rates could not be due only to the ‘permissive’ policy of higher admissions with minor injuries [32]. A host of factors, such as fast evacuation, immediate hospitalization and the quality of care, probably played an important role.

4. Discussion

Within the context of health promotion and disease prevention, studies focusing on hospital admission rates can shed light only on ‘the tip of the iceberg’, regarding a given health problem and they are possibly subjected to several biases related to changes in hospital admissions’ policy and coding procedures. However, trends in hospital admissions are of the utmost importance in order to set priorities and gain the support of policy-makers and professionals for adequate preventive measures.

Evidence from the follow-up studies of our school-based burn prevention program [8] indicated that the educational methods targeted at elementary school children had positive learning outcomes in the manner of knowledge gains and attitude changes. However, though the present data indicated an overall more consistent and more favorable trend in the rates of burn-related hospitalizations, among the older age groups, compared to the younger age groups, causal inferences regarding the direct effect of the intervention program are unwarranted, due to our study design. Based on the experience of others [11], there is good reason to believe that the present trend could be attributed to a multi-causal process in which a variety of societal, environmental and behavioral factors interacted.

Likewise, the higher admission rates among the younger age group of 0–4 yr could be linked to a host

of causes, such as their low risk-identification and risk-control abilities [33], the lack of simple and inexpensive safety products [34] and the absence of primary intervention measures among parents and supervisors. Since the study design did not permit us to support our assumption, that by educating school children, we could produce a ‘spill-over effect’ on parents’ behavior, we contend that there is an urgent need to develop an appropriate parent-based program to address this problem.

Regardless of patients’ age group, increased attention must be given to the vulnerable population of Bedouin children. Though these children made up less than 11% of the population served by Soroka Medical Center in 1995, compared to 28% of Jewish children, they accounted for 62% of the patients with burn- and scald-related injuries. Moreover, Bedouin children stayed longer in the hospital, compared to Jewish children, seven of whom had an average length of hospital stay of > 40 days, probably due to more severe injuries. Since no data regarding the extent of the burn injury (TBSA%) was available, it could not be confirmed. Likewise, we could only speculate, based on our data and others [12], that the higher average length of hospital stay among older children is probably related to the higher prevalence of fire-related burns in this age category. However, it should be noted that length of stay might also be related to the reluctance of our burn unit staff (personal communication) to send the convalescent child back to conditions that are less than optimal.

In summary, it seems apparent that it would take more than one monocyclic, educational program among elementary school children to control the injury-related ‘epidemic’, to minimize the disparities between Jews and Bedouins and to overcome the pathogenic effects of ethnic origin, socio-economic status and behavioral risk factors, on children’s health. Based on current ecological and empowerment theories [35,36] and relevant research [37], there is a need to shift from individual-based programs to environmentally based and community-oriented programs target-

ing: families, social networks, organizations, neighborhoods, communities and extra-community policy-makers. The strategies needed for building minority and ethnic groups' capacity to promote health are beyond the scope of this study and readers are referred to Robertson and Minkler [38], Israel et al. [39], Labonte [40] and Poole [41] for a more comprehensive account.

With regard to the issue of the person-focused burn prevention, it could be effective to use the mass media to raise awareness and 'set agendas' [42]. It is critical, of course, to base media campaigns on cultural values, norms and physical and environmental constraints of the targeted group. It would be unwise, for example, to recommend the elimination of the open fire among the Bedouin population, especially among the low socio-economic families and those living outside the urban settlements, given its traditional use for cooking, heating and family gatherings. It might, however, be effective to demonstrate fire safety skills such as: isolation of the fire site, supervision of the very young by older siblings and the provision of a water container for first aid. Since, to a considerable extent, major decisions in this tribal society are made by forums of male elders [27], they could function as powerful role models of high credibility. Based on our data, media campaigns targeted at the Bedouin population should be launched at the end of the summer season and those targeting the Jewish children should be launched at the end or during the winter season.

To achieve behavioral changes and a meaningful reduction in injury prevalence, the use of 'media advocacy' [42] should be strengthened by interpersonal advocacy of health care providers and community leaders and by structural and environmental changes initiated by local and national policy-makers. Since in Israel, more than 90% of the burn- and scald-related injuries in childhood occur at home, with a peak in the early afternoon hours of 1–3 p.m. and again between 7 and 9 in the evening [34], it is possible that the provision of afternoon and evening-care facilities for the very young and longer hours at schools for older children could reduce the number of home-related injuries.

Finally, success in controlling burn-related injuries requires ongoing in-patient and outpatient data collection, systematic coding procedures and detailed reports on the nature and causes of injuries. However, based on Antonovsky's salutogenic theory [43,44], we believe that the present challenge for public health is to venture beyond the pathogenic-oriented question of what causes disease and ill-health, to the more fruitful salutogenic question of what keeps people relatively healthy under diverse life conditions.

References

- [1] Walter AE, Baker SP, Szoeka A. Childhood injury deaths: national analysis and geographic variations. *Am J Public Health* 1989;79:310–5.
- [2] The National Council of Child Welfare. *Children in Israel*. Jerusalem, 1995.
- [3] Goffin R, Israel I, Palti H. The incidence of childhood and adolescent injuries and their outcome: a population-based study. *Isr J Med Sci* 1991;27:556–71.
- [4] Gilboa D, Friedman M, Tzur H. The burn as a continuous traumatic stress: implications for emotional treatment during hospitalization. *J Burn Care Rehabil* 1994;15:86–91.
- [5] Division of Injury Control. Childhood injuries in the United States. *Am J Dis Child* 1990;144:627–66.
- [6] Eldad A, Stern Z, Sover H, Neuman R, Benmeir P, Wexler MR. The cost of an extensive burn survival. *Burns* 1993;19:235–8.
- [7] Hendricks CM, Reichert A. Parents self-reported behaviors related to health and safety of very young children. *J Sci Health* 1996;66:247–51.
- [8] Shani E, Rosenberg L. Are we making an impact? A review of a burn prevention program in Israeli schools. *J Burn Care Rehabil* 1998;19:82–6.
- [9] Bandura A. *Social foundation of thought and action*. England Cliffs: Prentice-Hall, 1986.
- [10] McGuire JW. Public communication as a strategy for inducing health promoting behavioral changes. *Pre Med* 1994;13:229–319.
- [11] Brigham PA, McLoughlin E. Burn incidence and medical care use in the United States: estimates, trends and data sources. *J Burn Care Rehabil* 1996;17:95–107.
- [12] Chapman JC, Sahadi NS, Watson ACH. Declining incidence of pediatric burns in Scotland: a review of 1114 children with burns treated as inpatients and outpatients in a regional center. *Burns* 1994;20:106–10.
- [13] Zeitlin R, Somppi E, Jarnberg J. Paediatric burns in central Finland between the 1960s and 1980s. *Burns* 1993;19:418–22.
- [14] Callegari PR, Alton JDM, Shankowsky HA, Grace MGA. Burn injuries in native Canadians: a 10-year experience. *Burns* 1989;15:15–9.
- [15] Jayaraman V, Ramakrishnan KM, Davies M. Burns in Madras: Inida: an analysis of 1368 patients in one year. *Burns* 1993;19:339–44.
- [16] Van Rijn OJ, Bouter L M, Meertens RM. The aetiology of burns in developed countries: review of the literature. *Burns* 1989;15:217–21.
- [17] Van Rijn OJ, Grol MEC, Bouter LM, Mulder s, Kester ADM. Incidence of medically treated burns in the Netherlands. *Burns* 1991;17:357–62.
- [18] Marmot MG. Social differentials in health within and between populations. *Daedalus* 1994;123:197–215.
- [19] Alder NE, Boye T, Chesny MA, et al. Socioeconomic status and health. *Am Psychol* 1994;49:15–23.
- [20] Waller AE, Marshall SW. Childhood thermal injuries in New Zealand resulting in death and hospitalization. *Burns* 1993;19:371–6.
- [21] Gupta M, Gupta OK, Yaduvanshi RK, Upaahyaya J. Burn epidemiology: the pink city scene. *Burns* 1993;19:47–51.
- [22] Barell V, Zadka P, Halperin B, Sidramsky E. Childhood mortality from accident in Israel. *Isr J Med Sci* 1990;26:150–7.
- [23] Aspler E. *Burn epidemiology: a basis for burn prevention in Israel (dissertation)*. Beer-Sheva: Ben-Gurion University of the Negev, 1987.
- [24] *Statistical Yearbook of the Negev*. Beer Sheva: Negev Development Authority, 1995.

- [25] Carmel S, Anson O, Levin M. Emergency department utilization by two subcultures in the same geographical region. *Soc Sci Med* 1990;31:557–63.
- [26] Hundt GA, Foram MR. Interfacing anthropology and epidemiology: The Bedouin Arab infant feeding study. *Soc Sci Med* 1993;36:957–64.
- [27] Al-Krenawi A, Graham JR, Maoz B. The healing significance of the Negev's Bedouin dervish. *Soc Sci Med* 1996;43:13–21.
- [28] Darlinton RB. Regression and linear models. McGraw-Hill Publishing Company, 1990.
- [29] Statistical Abstracts of Israel. Jerusalem: Central Bureau of Statistics, 1986–1995.
- [30] Milo Y, Robonpour M, Glicksman A, Tamir G, Buvrin R, Hauben DJ. Epidemiology of burns in the Tel Aviv area. *Burns* 1993;19:352–7.
- [31] Munster A. Epidemiology, 10th Congress of the International Society for Burns Injuries. Jerusalem, 1998.
- [32] Benmeir P, Sagi A, Greber, et al. An analysis of mortality in patients with burns covering 40% BSA or more in a retrospective review covering 24 years (1964–88). *Burns* 1991;17:402–5.
- [33] Mori L, Peterson L. Knowledge of safety of high and low active-impulse boys: implications for child injury prevention. *J Clinic Child Psychol* 1995;24:370–6.
- [34] Shoham I, Levy E. Circumstances of childhood accidents. In: Symposium Franco-Israeli. Paris: INSERM, 1989. p. 75–144.
- [35] Stokols D. Translating social ecological theory into guidelines for community health promotion. *Am J Health Promotion* 1995;1:282–98.
- [36] Rissel C. Empowerment: the holy grail of health promotion? *Health Promot Int* 1994;9:39–47.
- [37] King AC. How to promote physical activity in a community: research experiences from the US highlighting different community approaches. *Patient Educ Couns* 1998;33:S3–S12.
- [38] Robertson A, Minkler M. New health promotion movement: a critical examination. *Health Educ Q* 1994;21:295–312.
- [39] Israel BA, Checkoway B, Schulz A, Zimmerman M. Health education and community empowerment: conceptualizing and measuring perceptions of individual, organizational and community control. *Health Educ Q* 1994;21:149–70.
- [40] Labonte R. Health promotion and empowerment: reflections on professional practice. *Health Educ Q* 1994;21:253–68.
- [41] Poole DL. Building community capacity to promote social and public health: challenges for universities. *Health Soc Work* 1997;22:163–70.
- [42] Tones K. Models of mass media: hypodermic, aerosol or agent provocateur. *Drugs Educ Prev Polic* 1996;3:29–37.
- [43] Antonovsky A. Health, stress and coping: new perspective on mental and physical well-being. San Francisco: Jossey-Bass, 1979.
- [44] Antonovsky A. Unraveling the mystery of health: how people manage stress and stay well. San Francisco: Jossey-Bass, 1987.