

What picture is worth a thousand words? A comparative evaluation of a burn prevention programme by type of medium in Israel

ESTHER SHANI¹, ARIEL AYALON¹, ITZHAK ABU HAMMAD¹ and
FABIENNE SIKRON²

¹The Center for Research and Development of Advanced Services in Plastic Surgery, The Faculty of Health Science, Ben-Gurion University of the Negev, Beer-Sheva and ²Israel National Center for Trauma and Emergency Medicine Research Unit, The Gertner Institute for Epidemiology and Health Policy Research, Sheba Medical Center, Tel-Hashomer, Israel

SUMMARY

Burns are associated with longer hospital stay, permanent disfigurement and emotional stress disorders, and represent a health problem, especially among economically and socially deprived populations, such as the Bedouin population in Israel, hence the importance of intervention programmes. The objective of this research was to examine the extent to which the effect of a visual one-session burn prevention programme was determined by the type of medium used. We also examined the possibility that fear motivates action only when someone feels confident in his/her ability to control the threat. Data were based on the pre-/post-programme self-report questionnaires administered to a randomly selected three-group sample of 12- to 13-year-old Bedouin children ($n = 179$). All three sessions were identical, but differed in the type of medium used: slides (S), video (V), or slides and video consecutively (S + V). We measured health beliefs (perceived threat, internal/external control, self-efficacy) and sense of coherence (SOC), both before and 2 months after completion of the intervention. We also measured

post-programme fear reaction and the improvement in burn-related knowledge, understanding and safety behaviour as the outcome measure. No significant post-programme differences between intervention groups were found, either in terms of outcome measure or in terms of health beliefs and SOC. However, within-person analysis indicated that the S group participants had the highest level of post-exposure fear and a decrease in luck control over injuries. The S + V group demonstrated the lowest within change. The hierarchical regression analysis revealed that self-efficacy, fear, higher socio-economic status and female gender predicted improvement. As hypothesized, the interaction between fear and self-efficacy added significantly to prediction. It seems that health beliefs and demographic characteristics were more powerful in predicting the effect of the intervention than the choice of medium per se. A multifaceted approach and more comprehensive interventions are needed in order to promote health among disadvantaged populations.

Key words: Bedouin children; burns; prevention

INTRODUCTION

Recent decades have witnessed an increased interest in comprehensive interventions aimed at the diverse societal woes of economically

developed countries, such as substance abuse, violence and sexual-risk behaviour. Comparatively, less attention has been given to injury

control, although injuries are the leading cause of preventable death, disability and years of life lost among children and adolescents, affecting one in every three to four (Barell *et al.*, 1990; Hendricks and Reichert, 1996; Patterson, 1999). They also rank among the most costly of conditions (MacKenzie *et al.*, 1988). More specifically, for the group aged 0–14 years, home-related injuries take an extremely high toll (Mori and Peterson, 1995) and of these, burns have often been identified as the most significant hazard with regard to chance of being hospitalized, length of hospital stay, permanent disfigurement and emotional stress disorders (Gilboa *et al.*, 1994; Franulic *et al.*, 1996). In Israel, as well as in other countries, >90% of burn injuries occur in and around the domestic environment, and the most common risk factor is contact with hot liquids (Shoham and Levy, 1989; Van Rijn *et al.*, 1991). Although death rates are in decline, as to a lesser degree are hospitalization rates (Brigham and McLoughlin, 1996; Liao and Rossignol, 2000; Shani *et al.*, 2000), burns have remained a severe health problem among economically and socially deprived populations worldwide. For example, injury mortality rates among African-American children are up to five times those among whites of all age and sex groups (CDC, Division of Injury Control, 1990). Data from Scotland indicate a 2.29 injury mortality risk ratio between the most and least deprived populations of children aged 0–14 years (Morrison *et al.*, 1999). Similar trends are evident in New Zealand among Maori and Polynesian children (Waller and Marshall, 1993), in India (Gupta *et al.*, 1993) and in Israel among the non-Jewish population (Barell *et al.*, 1990; Shani *et al.*, 2000).

Beyond these persisting class-related discrepancies, the causes of the overall favourable trend reflect the beneficial effect of educational efforts, safety regulations and societal changes (Brigham and McLoughlin, 1996). However, since most burn injuries are behaviourally determined, educational measures must be a crucial component of preventive efforts (Liao and Rossignol, 2000); hence the utilization of schools as one of the most appropriate and effective settings for the delivery of health education [Hawkins and Catalano, 1990; Shani and Rosenberg, 1998; World Health Organization (WHO), 1999].

Since 1986, our university centre has taken the lead in the area of burn prevention in Israel.

Focusing on elementary school children, an educational programme was developed (Shani and Rosenberg, 1992; Shani and Rosenberg, 1998). The programme included, in addition to lesson plans, safety checklists, posters and games, a set of 60 slides covering the most prevalent risk factors. The slides were organized in pairs, the first showing a dramatized hazardous situation and the second the 'real' and unfortunate consequences.

To date, >500 000 school children have been exposed to the programme nationwide. Several evaluation studies have been conducted over the years, indicating significant changes in knowledge and injury-control beliefs between exposed versus non-exposed groups (Carmel *et al.*, 1991), and a high programme approval by school teaching staff and principals (Razael and Benbenishti, 1991). An overall trend of reduction in the number of hospitalized children with burn injuries was also evident (Shani *et al.*, 2000).

Our positive results notwithstanding, it is worth mentioning that an inherent tension existed between schools' needs and priorities and the programme's original preferred method of the teacher-as-instructor and effect-to-classroom hours. Consequently, the design and implementation procedures were modified and the number of classroom sessions was reduced to three. Despite these changes, the exposure of the most vulnerable group—Bedouin children in the southern Negev region of Israel—was especially low. Not only were we short of Arabic-speaking volunteers, but the majority of schools were reluctant to cooperate and some lacked the facilities to do so (personal experience of first and third authors).

Over 110 000 Bedouins live in the Negev area, accounting for one-quarter of the region's population, 56% of whom are <14 years of age (Abu-Rabiyya *et al.*, 1996). The low socio-economic status and educational level of this population group (Hundt and Forman, 1993) put them at a very high risk for diverse health problems, including burn injuries. It therefore became necessary, in this context, to reappraise the programme's design and implementation procedures. Elaborating on the experience of others (Bass *et al.*, 1993), we decided to examine whether one visual informational session could make an impact. Additionally, it was hard to ignore the request of some of the schools to replace the slides with a video film in order to reduce teachers' commitment to that of being

mere spectators. Originally, the assumption was that slides could be more effective than a video film since they coupled the benefits of a visual presentation with the beneficial characteristics of the more active 'face-to-face' interaction (Katz and Lazarsfeld, 1955). The dearth of evidence regarding the effect of informational interventions by type of medium and the availability of a burn prevention video film in Arabic, produced and distributed to members by the Mediterranean Burn Club (MBC) (Ferrara *et al.*, 1987), set the primary goal for this comparative study. However, based upon the long line of research suggesting that repetition enhances the persuasive impact of messages (Tellis, 1997), the comparative effect of a mixed media session (slides plus video) was also investigated.

Similar to the programme's design, the following study was developed within theoretical constructs derived from the information-processing theory (McGuire, 1973), the social learning theory (Bandura, 1986), and the more recent fear-appeal theories (Prentice-Dunn and Rogers, 1986; Witte, 1992). According to McGuire's input/output matrix, behavioural changes are determined by the cumulative effect of the communication factors (source, channel message receiver and destination) on the response variables (attention, comprehension, yielding, retention, behaviour). The higher the impact evoked by each factor on each of the cognitive substeps, the greater the likelihood of behavioural changes. A more thorough insight into the change process is offered by the fear-appeal literature, which is based on the assumption that all people have an inherent motivation for self-protection. Thus, when a health threat is perceived as low or irrelevant, no protective actions can be expected. However, when fear-arousing cues produce high fear and high threat reactions, pathological outcomes, manifesting as maladaptive avoidance behaviour, might occur, unless, as suggested by Bandura (Bandura, 1986) and elaborated by Witte (Witte, 1992), one has a strong sense of self-efficacy, i.e. the confidence in one's ability to carry out recommended threat-controlled actions. In this sense of interactive influence, self-efficacy functions as a moderating variable. On the other hand, there is a wealth of evidence indicating that efficacy beliefs and a strong sense of personal control are essential and directly related not only to health promoting actions (O'Leary, 1992), but also to overall health and well-being (Seligman, 1975). Yet this assumption is to a great extent culture bound and

typical of Western societies (Brownell, 1991), whereas in the Muslim tradition, health is in the hands of fate or Allah (Al-Krenawi *et al.*, 1996). Thus, the role of the internal versus external locus of control belief (Wallston, 1992) in burn prevention was also assessed. Finally, transcending cultural lines and domain-specific beliefs, the relative predictive power of the sense of coherence (SOC) construct (Antonovsky, 1987), as a more generalized personality disposition of coping with stressful events, was investigated. The SOC is defined as a dispositional orientation to life in which the world is seen to a greater or lesser degree as comprehensible, manageable and meaningful. Antonovsky's salutogenic perspective that the stronger the SOC the higher the health and the lower the risk-taking behaviour has been supported by several studies among diverse population groups (Antonovsky, 1993), although none, to our knowledge, are similar to the one reported in this study.

In sum, focusing on the extent to which the effect of a visual one-session intervention programme was determined by the type of medium used, we examined: (i) between-group differences and within-person changes in health beliefs and intervention programme effect; (ii) the relative and unique contribution of health beliefs, fear reaction and personality disposition, as well as demographic factors and type of medium, to the prediction of the intervention effect; and (iii) the possibility that fear motivates action only when someone feels confident in his/her ability to control the threat (i.e. the moderating variable hypothesis).

METHODS

Participants

Based on examination of documentation, out of the total 34 primary and junior Bedouin high schools in the Negev area, 13 schools had not been exposed to the programme at the time of the study. Of these, three were randomly selected. However, due to technical problems with the questionnaires, one of the schools ('no medium' control group) was not included. The final sample for this study consisted of 179 Bedouin children aged 12–13 years from six seventh grade classes in two schools in the villages of Tel-Sheva and Hura.

Within each school, two classes were randomly assigned to one of the three treatment

(intervention) conditions: slide group (S), video group (V), and slide plus video group (S + V).

The intervention programme

A trained Arabic-speaking programme guide (3rd author) delivered all three intervention programmes. Both the S and V groups were exposed to one 45-min school session each, while the S + V group intervention lasted for ~90 min.

Although different burn prevention centres produced the video film and slides set, their approach, presentation method and choice of characters and events are to a great extent identical. Both focus on the most common risk factors for children (i.e. hot liquids, hot objects, electricity, fire and chemicals) in and around the home environment, and both utilize a two-step presentation, beginning with a dramatized risk situation followed by a picture of the 'real' and unfortunate consequences—a burn or scald injury.

Data collection

After obtaining the approval of the Ministry of Education and the informed consent of our participants, the pre-programme self-report questionnaire (in Arabic) was administered in class before the intervention during a 2-week period in February 1996. The follow-up post-programme questionnaire was obtained ~2 months after completion of the three intervention treatments, in May 1996. The same teacher's guide who delivered the intervention conducted all of the above procedures.

For data analysis, questionnaires were matched on the basis of school, class and student's full names.

Measurements

Unless stated otherwise, all items were measured on a four-point Likert scale, and the mean score was used to form the composite index.

'Program effect' was assessed by four items measuring reported post-programme improvement in burn-related knowledge, understanding and safety behaviour (operationalized on the basis of McGuire's output variables). The higher the post-questionnaire composite score the more positive the effect (Cronbach's alpha value was 0.73).

'Fear response' was measured post-questionnaire by five mood adjectives, such as afraid, anxious or uncomfortable [(adapted from (Rogers and Mewborn, 1976)]. The higher the score the greater the fear (Cronbach's alpha was 0.72).

'Threat' was measured by 19 items. Four items assessed perceived severity of burn injuries caused by chemicals, hot liquids, electricity and flames. Seven items measured perceived vulnerability to various types of burn injury. Seven identical items assessed perceived likelihood of a family member being injured. The higher the composite score the greater the threat (pre- and post-questionnaire Cronbach's alpha values were 0.86 and 0.91, respectively).

'Internal control' was measured by two items assessing participant's belief in behavioural control over burn injuries (pre- and post-questionnaire Pearson's *r* correlations were 0.23 and 0.49, respectively). The higher the score, the stronger the sense of control.

'External control' was measured pre- and post-questionnaire by one item on a four-point scale assessing the agreement with the statement that injuries are a matter of bad luck. A higher score indicates a stronger belief in luck.

'Self-efficacy' was measured by five items assessing to what extent the participants believed they were capable of following safety instructions regarding the prevention of fire-, electricity- and hot liquids-related burns, and also teaching other family members safety measures (pre- and post-questionnaire Cronbach's alpha values were 0.51 and 0.72, respectively). A higher score indicates a stronger sense of self-efficacy.

SOC was measured using the abbreviated SOC questionnaire (Antonovsky, 1987), which was translated into Arabic. The 13 items measure the extent to which the individual finds life to be manageable, meaningful and comprehensible on a seven-point scale with descriptive end points. A mean score was derived from the 13 items (pre- and post-questionnaire Cronbach's alpha values were 0.55 and 0.60, respectively). A higher score indicates a stronger SOC.

'Socio-demographic' (control) variables included gender, parents' occupational status (unemployed or housewife, blue-collar, white-collar), parents' educational level (mean years of formal schooling), type of housing (concrete, shed, hut, tent), family size (*n*), level of family religiosity (orthodox, religious, traditional,

non-religious), and previous self and family experience of burn injuries (yes/no).

Statistical procedures

Data analyses were conducted using SPSS for Windows 5.0, and involved four types of operation: (i) analysis of variance (ANOVA) and Tukey's multiple range test to measure significant between-group differences in background variables, health beliefs, dispositional characteristics and intervention effects; (ii) paired *t*-test (two-tailed) to measure within-person changes in health beliefs; (iii) analysis of bivariate relationships among the dependent and independent variables using Pearson's *r* correlation coefficient; and (iv) hierarchical regression analyses to estimate the relative predictive power of the independent variables and the moderating effect of self-efficacy. The level of significance was set at 0.05. All *p*-values are two-sided.

RESULTS

The final three-group sample consisted of 179 seventh-grade children (59, 59 and 61 in the V, S and S + V groups, respectively). Although no record of response rates is available, based on the statistical yearbook of the Negev (Negev Center for Regional Development, 2000), the average number of children per class in the two Bedouin villages at the time of data collection ranged between 30.4 in Hura to 31.0 in Tel-Sheva. We could thus assume that our response rates were high.

Sample characteristics

Since no significant between-group differences were found in socio-demographic variables, including past experience of burn injuries, the profile of the overall sample is presented in Table 1.

The high percentage of unemployment among women, as well as the low education level of both parents, emphasizes the low socio-economic status of this population group. These data are not surprising considering the fact that it was only in 1969 that the first high school for Bedouin children opened, and only in 1972 that free compulsory education in Israel was extended from 8 to 10 years (Abu Saad, 1991). Most of the children (75%) lived in concrete permanent houses. The number of family members was high, with a mean of 10. Most of the children regarded

Table 1: Sample characteristics (*n* = 179)

Variables	
Gender (%)	
Males	52.5
Occupational status of father (%)	
White collar	11.7
Blue collar	45.1
Unemployed	43.2
Occupational status of mother (%)	
White collar	3.7
Blue collar	0.6
Housewife	95.7
Educational level of father (years)	
Mean	5.67
Standard deviation (SD)	5.27
Range	0–20
Educational level of mother (years)	
Mean	3.38
SD	4.78
Range	0–17
Type of housing (%)	
Concrete	75.0
Shed	16.3
Hut	7.0
Tent	1.7
Family members (mean number)	
Mean	10.18
SD	4.03
Range	1–27
Religiosity (%)	
Orthodox	41.2
Religious	29.6
Traditional	25.6
Secular	0.6

their family as orthodox or religious. For the 50% of the sample who had personally experienced burn injuries in the past, the most common aetiological factors were contact with hot liquids (42%), fire and flames (28%), cooking (20%) and electricity (10%). The distribution of etiological factors reported here are consistent with our previous findings among hospitalized Bedouin children (Shani *et al.*, 2000). Additionally, almost 50% of the participants reported a burn-related injury among family members, caused by contact with hot liquids (53%), fire and flames (24%), cooking (13%), electricity (6%) and chemicals (4%).

Between-group differences

The one-way ANOVA conducted in order to assess between-group differences in programme effect, fear-reaction, health beliefs and personality characteristics (Table 2) revealed significantly

Table 2: Between-group differences in post-programme effect, fear reaction and health beliefs (pre- and post-programme)

Variables	Groups			<i>p</i> -value
	V	S	S + V	
Program effect				
Post-programme				
Mean	3.58	3.56	3.45	Not significant (NS)
SD	0.51	0.56	0.76	
Fear				
Post-programme				
Mean	2.51	2.78	2.35	0.02 ^a
SD	0.87	0.79	0.82	
Threat				
Pre-programme				
Mean	2.96	2.83	3.10	0.01 ^a
SD	0.61	0.43	0.48	
Post-programme				
Mean	3.78	3.16	3.24	NS
SD	0.37	0.57	0.62	
Internal locus of control				
Pre-programme				
Mean	3.56	3.64	3.53	NS
SD	0.62	0.67	0.73	
Post-programme				
Mean	3.34	3.47	3.12	NS
SD	0.83	0.81	1.04	
External locus of control				
Pre-programme				
Mean	2.41	2.47	1.92	0.04 ^a
SD	1.30	1.13	1.20	
Post-programme				
Mean	1.94	1.91	1.75	NS
SD	1.08	1.13	1.07	
Self-efficacy				
Pre-programme				
Mean	3.44	3.20	3.41	NS
SD	0.66	0.59	0.61	
Post-programme				
Mean	3.50	3.41	3.49	NS
SD	0.53	0.52	0.74	
Sense of coherence				
Pre-programme				
Mean	4.96	4.75	4.95	NS
SD	0.83	0.63	0.90	
Post-programme				
Mean	4.46	4.47	4.79	NS
SD	0.77	0.69	1.02	

^aStatistically significant difference between mean scores of S group compared with S + V group (Tukey's range test).

higher mean scores of perceived threat and the lowest mean scores of external locus of control among the S + V participants at the pre-programme stage. However, contrary to our assumption, no significant differences in the mean scores of the post-programme effect measure were found.

Likewise, no significant differences in the mean scores of the post-programme health beliefs were found, except for the reported fear

reaction, which was highest among the S group participants, although statistically significant only in comparison to the S + V group.

Within-person changes

Further analysis, which assessed within-person changes in health beliefs (Table 3), indicated a significant post-programme increase in perceived threat and a significant decrease in the SOC scale

Table 3: Within-person changes in health beliefs (pre- to post-programme)

Variables	Groups		
	V	S	S + V
Threat			
Pre-programme			
Mean	2.91	2.77	3.03
SD	0.68	0.61	0.51
Post-programme			
Mean	3.32	3.12	3.18
SD	0.50	0.67	0.63
<i>t</i> score	5.03 ^c	4.39 ^c	NS
Internal locus of control			
Pre-programme			
Mean	3.56	3.66	3.56
SD	0.61	0.60	0.71
Post-programme			
Mean	3.34	3.47	3.12
SD	0.53	0.80	1.03
<i>t</i> score	NS	NS	2.46 ^a
External locus of control			
Pre-programme			
Mean	2.35	2.50	1.91
SD	1.29	1.16	1.17
Post-programme			
Mean	1.94	1.92	1.76
SD	1.09	1.13	1.08
<i>t</i> score	NS	2.58 ^b	NS
Self-efficacy			
Pre-programme			
Mean	3.34	3.04	3.21
SD	0.61	0.57	0.60
Post-programme			
Mean	3.34	3.20	3.38
SD	0.53	0.57	0.73
<i>t</i> score	NS	NS	NS
SOC			
Pre-programme			
Mean	4.94	4.74	4.93
SD	0.84	0.65	0.90
Post-programme			
Mean	4.46	4.47	4.79
SD	0.77	0.69	1.02
<i>t</i> score	4.41 ^c	2.75 ^b	NS

^a $p < 0.05$; ^b $p < 0.01$; ^c $p < 0.001$.

among both the V group and the S group participants. However, only among the S group participants was a significant decrease in luck control over burn injuries evident, and only among the S + V participants was a significant decrease in internal control over health found.

Prediction of the programme effect measure

Prior to the regression analysis, the intercorrelations between the health beliefs variables and the programme effect measure

were examined. The results showed that except for the belief in luck control over burn injuries, the programme effect measure had a significant low-to moderate correlation with all the health beliefs, the highest of which was the correlation with self efficacy ($r = 0.53$; $p < 0.001$) and the weakest of which was with the internal locus of control measure ($r = 0.23$; $p < 0.01$). The strongest intercorrelation was found between self-efficacy and the SOC index ($r = 0.35$; $p < 0.001$), and the weakest was found between the measures of threat and fear ($r = 0.15$; $p < 0.05$)

Table 4: Significant predictors of post-programme effect

Predictors	β	r^2	p -value
Step I			
Self-efficacy	0.530	0.281	<0.001
Gender (female)	0.264	0.347	<0.05
Socioeconomic status	0.206	0.387	<0.01
Fear	0.165	0.410	<0.01
Step II			
Fear \times self-efficacy	-1.08	0.438	<0.05
Δr^2	0.414		

and between fear and self-efficacy ($r = 0.17$; $p < 0.05$). We next performed a two-step hierarchical regression on the overall sample (Table 4). Prior to the statistical procedures, two measures were constructed: (i) socio-economic status was obtained by summing up responses to the following: father's educational level (1 = >8 years, 0 = ≤ 8 years), father's occupational status (1 = employed, 0 = other), and living condition (1 = concrete house, 0 = other); and (ii) past experience with burn injuries summed up by responses to two questions: self experience (1 = yes, 0 = no) and family experience (1 = yes, 0 = no).

First the independent variables were entered simultaneously, allowing exploration of their relative and unique predictive power, and then we examined whether the product of fear \times self-efficacy accounted for any residual variance. The results indicated that the most important predictor of programme effect was self-efficacy, which accounted for 28% of the variance. Gender (female) accounted for an additional 7%, while socio-economic status and fear accounted for a unique and significant 4% each. The interaction effect was also significant, accounting for an additional 3% of the variance above and beyond the direct impact of self-efficacy, gender, economic status and fear. In other words, among those participants who reported higher levels of post-exposure fear, as well as a stronger belief in their self-efficacy, the likelihood of improvement in burn-related knowledge and risk-control behaviours increased significantly.

DISCUSSION

In an effort to promote burn prevention among a high-risk group of Bedouin children in Israel,

a visual (slides) intervention programme was developed. In an attempt to overcome teachers' reluctance to participate the intervention was reduced to one school session, and the comparative effect of a more 'passive' medium (video) was studied as well as the use of both video and slides in a three-group sample of seventh grade children in two Bedouin schools. The socio-demographic profile of our participants, identical across groups, indeed indicated their overall low socio-economic status and high risk for burn injuries.

Before data is interpreted further, several limitations of the present study should be considered. First, unequivocal conclusions and generalization are limited due to our small sample size and the lack of a matching (no visual aid) control group. Also, self-report bias cannot be ruled out, although the validity of the answers is supported to a certain extent by the pattern and direction of our findings across groups and in a more general manner by others [e.g. (Abraham and Hampson, 1996)]. Finally, outcome measure was limited to between-group variations on the knowledge and behaviour scale, without consideration of change, although the aspect of change in health beliefs as predictors was investigated.

Contrary to our basic assumption that a slide presentation would be more persuasive than a video film due to its inherent 'face-to-face' characteristic, and that use of both consecutively might have a stronger effect size due to the repetition of messages, no between-group differences were detected in the post-programme effect measure, which assessed reported improvement in knowledge, understanding and burn prevention behaviour. Within our theoretical framework, the above data conforms to a similar pattern, indicating identical between-group scores on the post-programme health beliefs measures and the personality orientation trait (SOC). However, focusing on the question of effect from the point of view of process, rather than the outcome per se, did offer numerous results that could, with all the necessary caution, illuminate theoretical as well as practical dilemmas. For example, in accordance with others [e.g. (McCaul *et al.*, 1996; Cantor and Omdahl, 1999)], there was no support for the earlier fear-appeal hypothesis concerning the pathological effect of a high fear arousal (Hovland *et al.*, 1953). On the contrary, consistent with a recent meta-analyses (Witte and Allen, 2000), the present data suggested that the stronger the fear reaction the higher the likelihood of a desired effect. Thus, while no effect by type

of medium was evident, it was the slides that produced both an increase in perceived threat, which was significantly related to the programme effect measure, and the highest level of fear, which contributed directly to its prediction. Yet it was clear that regardless of the visual aid, a short informational session was impotent in its impact on the most crucial motivating factor of self-efficacy. In fact, the consecutive presentation of slides and video produced the poorest results with regard to desired changes in health beliefs. It could suggest that 'more of the same' might be superfluous and what was needed, from a practical perspective, was at least one additional session of skill-enhancing burn prevention experience (e.g. role-modeling), as recommended by the social learning theory (Bandura, 1986), the more recent fear-appeal theories (Witte and Allen, 2000) and our own burn prevention programme design (Shani and Rosenberg, 1998). Of particular interest in the present study are the unexpected findings indicating a significant post-programme decrease across groups (significant for the S and V groups only) in the strength of the orientation to life trait (the SOC) and the loss of the SOC predictive power despite its significant positive correlation ($r = 0.28$, $p < 0.01$) with the programme effect measure. Based on Antonovsky (Antonovsky, 1987) and others (Erikson, 1969), the changes could be attributed to the psychological instability and confusion that characterizes the first phase of adolescence. The loss of the SOC predictive power could be attributed to its correlation with the self-efficacy measure, and it could also suggest that specific behavioural skills are best predicted by a specific set of beliefs, whereas the more generalized life orientation might contribute only indirectly. Yet, it could also be a result of methodological limitations rooted in our translation into Arabic. Further research is clearly needed in order to investigate the role of the SOC in health and health behaviour patterns in order to venture beyond the pathogenic orientation to health to a more fruitful salutogenic question of what keeps people healthy under adverse life conditions. Partly, the answer lies in our finding that a significant proportion of the variance in the programme effect measure was accounted for by gender (girls) and a higher socio-economic status. Although this finding is consistent with others and persistent across time and cultures (Macintyre and Hunt, 1997), it is rather disturbing. Not only are the social inequalities beyond these children's control, but

the disparities between higher and lower classes are widening, mortality and morbidity rates among the lower socio-economic status children are increasing, and the prevalent policy almost worldwide is still 'blame the victims' for their poor health (Atwood *et al.*, 1997). Within these social limitations, it is apparent that a multifaceted approach to health promotion is needed. Regardless of medium, it seems that a minimal individual-based intervention, although cheap and tempting, would result in minimal effect, if any [e.g. (Connell *et al.*, 1985)]. Moreover, even longer and more rigorous school interventions should be supplemented by parental involvement (e.g. Tinsley, 1992). Optimally, empowering the whole community (e.g. Rissel, 1994) and embracing the full range of safety regulations and engineering techniques (Lescohier *et al.*, 1990) could be most rewarding. Finally, Clark's advice (Clark, 1983) that media selection should be made on the basis of access and economic criteria, since they are all merely delivery vehicles and do not influence educational outcomes, is challenging and clearly calls for further comparative research.

Address for correspondence:

Dr Esther Shani
Plastic Surgery Department
Soroka University Medical Center
Beer-Sheva
Israel
E-mail: geshani@netvision.net.il

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