ASSOCIATION BETWEEN COPING STRATEGIES AND PSYCHOLOGICAL ADJUSTMENT AFTER SMALL BURN INJURIES. A CROSS-SECTIONAL STUDY

Lucia Sideli, Angela Di Pasquale, M. Valentina Barone, Alice Mulè, Alessia Prestifilippo, Sabrina Cataldi, Rosanna Lo Coco, Daniele La Barbera

Abstract

Objective: This study aimed at describing the coping strategies used by patients of small burns (≤ 20% body surface area) at the early stage of rehabilitation process and to analyze the effect of coping strategies and body image dissatisfaction on psychiatric symptoms and quality of life.

Method: Sixty-nine patients firstly admitted to an out-patient burn unit were involved in the study. Coping response to burn trauma was investigated using the Brief-COPE, while the Short-Form 36 Health Survey, the Self-report Clinical Inventory, and the Body Uneasiness Test were used respectively to assess post-burn quality of life, psychiatric symptoms, and body image dissatisfaction.

Results: Avoidant coping strategies were related to poor mental quality of life and symptoms of obsessivity, depression, anxiety, and psychoticism. Furthermore, body image dissatisfaction was related with symptoms of obsessivity, depression, anxiety, hostility, and somatization. No significant predictor was found for interpersonal sensitivity and paranoia.

Conclusions: The findings remark the role of coping strategies in modulating the psychological adjustment and the psychopathological morbidity in the very early stage of burn recovery and rehabilitation. Beyond the effect of coping, body image distress significantly contributed to worsen psychological outcome.

Key words: burn, coping, body image dissatisfaction, psychosocial adjustment, psychiatric morbidity

Declaration of interests: none

Sideli Lucia[1], Di Pasquale Angela[2], Barone M. Valentina[1], Mulè Alice1, Prestifilippo Alessia[1], Cataldi Sabrina[2], Lo Coco Rosanna[2], La Barbera Daniele[1]

[1] Department of Experimental Biomedicine and Clinical Neuroscience, section of Psychiatry, University of Palermo, Palermo (Italy)

[2] Operative Unit of Plastic Surgery and Burn Therapy, Civico and Benfratelli Hospital, Palermo (Italy)

Corresponding author
Lucia Sideli
Section of Psychiatry, Department of Experimental Biomedicine and Clinical Neuroscience
via G. La Loggia, 1, 90129 Palermo (Italy)
Tel: +39916555170
Fax: 39916555165
E-mail: lucia.sideli@gmail.com

1. Introduction

Although the advances of medicine and surgery have substantially reduced mortality rates due to burn injuries, burns still represents a major causes of disability, leading every year in high-income countries to the loss of 2,000,000 of "healthy" years of life (disability-adjusted life years, DALY) (World Health Organization 2009). Accumulating research claims that burns produce substantial changes in quality of life and increase the risk for psychiatric symptoms, such as depression and anxiety, and these effects are not limited to severe burn traumas but may occur also after small burn injuries (van Baar et al. 2006, Klinge et al. 2009). Evidence suggests that even patients with minor burn injuries, involving less than 20% of the body surface area, show a reduced quality of life, body image distress (Dahl et al. 2012), anxiety and post-traumatic symptoms (Shakespeare 1998, Tedstone et al. 1998), and need for psychiatric care (Blumenfield and Reddish 1987). Indeed, the psychological consequences of burn trauma seem not only determined by dimensions and localizations of burn injuries (Fauerbach et al. 2005, Wallis et al. 2006), but also influenced by psychological and social factors, such as coping strategies and body image distress, according to the principle "small burn, big problems" (Blumenfield and Reddish 1987).

In psychology, the term "coping" refers to both cognitive and behavioral efforts made to manage stressful events and situations (Lazarus 1993). Coping may take the form of removing or modifying the source of stress, either by planning and carrying on problem-solving activities or by seeking social support to receive advice and information (defined as "problem-focused strategies"). Alternatively, coping may be focused on the negative emotions related to psychological stress, for instance by accepting the actual problem, or minimizing its relevance, or getting understanding and sympathy from others (defined as "emotion-focused strategies") (Carver et al. 1989, Lazarus 1993). Besides problem-focused and emotion-focused strategies, it was suggested that under particular circumstances persons prefer just to

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distance themselves from the stressor rather than coping with it and its related negative emotions. Reducing personal effort to deal with the problem, focusing on work or leisure activity to distract oneself from the stressor, and use of alcohol and drugs can be regarded as examples of these "avoidant strategies" (Carver et al. 1989).

Coping strategies have been recognized as critical factors in psychological adjustment both after major and minor burn injuries (Tedstone et al. 1998, Van Loey et al. 2001, Esselman et al. 2006, Klinge et al. 2009). Accumulating evidence has suggested that active problem-solving, positive reframing (i.e. modifying point of view in order to see things in a more positive way), and emotional social support are related with an enduring better quality of life in burn patients (Tedstone et al. 1998, Willebrand et al. 2001, Kildal et al. 2005). By contrast, avoidant coping strategies are related with increased post-traumatic stress disorders (PTSD) (Fauerbach et al. 2002, Lawrence and Fauerbach 2003, Willebrand et al. 2004, Sveen et al. 2011) and depressive symptoms (Fauerbach et al. 2002, Willebrand et al. 2004, Braš et al. 2007), as well as with higher body distress or dissatisfaction (Fauerbach et al. 2002). Efficacy and success of coping strategies are strongly affected both by the features of the stressor, including severity and time, and by psychosocial and personality characteristics of the individual. While problem-focused strategies allow to manage events and situations that are considered to be modifiable by the individual, emotion-focused and avoidant strategies might be effective in facing chronic stressors or conditions that are viewed as refractory to change (Carver et al. 1989, Lazarus 1993) and might be intensively used at the very early stage of coping process (Kildal et al. 2005).

Along with coping strategies, body image distress or dissatisfaction has been widely investigated in relation to post-burn psychological outcomes (Klinge et al. 2009, Hobbs 2015). Qualitative studies point out that fragility of the skin, vulnerability of the body, and increased body awareness are common themes in patients' experience during the post-burn adjustment process (Tengvall et al. 2010, Dahl et al. 2012). Furthermore, quantitative studies suggest that during the rehabilitation process, approximately one-third of adult burn survivors report significant body image distress (Model Systems Knowledge Translation Center, 2011) that strongly affect their quality of life and increase the risk for depressive symptoms and disorders (Fauerbach et al. 2000, Thombs et al. 2008).

The aim of this cross-sectional study was to describe coping strategies used by patients affected by small burns, defined as less than 20% body surface area (Shakespeare 1998), in the first month post-trauma and to analyze the effect of coping strategies and body image dissatisfaction on self-assessed quality of life and psychiatric symptoms.

We hypothesized that avoidant coping strategies and poor levels of satisfaction with body image would negatively affect post-burn psychiatric symptoms and quality of life.

2. Materials and methods

The study project was approved by the clinical team of the Operative Unit of Plastic Surgery and Burn Therapy of the Civico and Benfratelli Hospital of Palermo (Italy). Potential participants were recruited by psychologists and medical residents about one month after their first admission in the out-patient burn unit. All the participants were informed about the study's aims and procedures and provided their written informed consent. Participants' anonymity was maintained through data collection and data analysis. Psychologists and medical residents distributed the self-report questionnaires to the patients and, where needed, assisted them in providing written answers to the questions. Socio-demographic and clinical information was collected for every patient. All the questionnaire were administered in a time limited way by referring to what the person thought, felt, and did after the burn injury.

2.1. Participants and settings

Participants were adult burn patients with total burn surface area lower or equal to 20%, recruited from the Operative Unit of Plastic Surgery and Burn Therapy of the Civico and Benfratelli Hospital of Palermo (Italy). Patients were excluded if they were not fluent in Italian, presented either severe perceptual disabilities or mental retardation, or had received any diagnosis or treatment for major psychiatric (such as schizophrenic disorders, major depressions, attempted suicide, or PTSD) or neurological disorders (such as dementia or epilepsy).

2.2. Measures

2.2.1. The Coping Orientation to Problems Experienced (COPE)

The Brief COPE (Carver 1997) is the abbreviated version of the COPE inventory (Carver et al. 1989, Conti 1999, Carver 2013) broadly used to assess coping response in health care settings. The Italian Brief COPE showed satisfying psychometric properties (Conti 1999) and the English version was validated on two samples of burn patients demonstrating good construct validity in relation to the SF-12 (Spearman's rho: 0.166 – 0.396) and to the Davidson Trauma Scale (Spearman's rho: 0.154 – 0.618) (Lawrence and Fauerbach 2003, Amoyal et al. 2011). The questionnaire consists of 15 subscales, each of them represented by four items. Factorial analysis suggested a three-dimension solution including problem-focused strategies, emotion-focused strategies, and avoidant strategies (see **table 1**) that was partially replicated in the validation on burn patients (Lawrence and Fauerbach 2003, Amoyal et al. 2011). Response choices range from 1 ("I usually don't do this at all") to 4 ("I usually do this a lot"). Mean scores were calculated for each of the 15 subscales and for the three dimensions.

2.2.2. The Body Uneasiness Test (BUT)

The BUT is a self-report questionnaire used to evaluate body image dissatisfaction in the general and clinical populations (Cuzzolaro et al. 1999, Cuzzolaro et al. 2006). The Italian BUT showed good internal consistency (Cronbach's alpha: 0.69-0.90), construct (part A chi square=1388.18 $p<0.001$, part B chi square=1004.6, $p<0.001$) and concurrent validity (with significant correlations with measures of general psychopathology, such as the SCL-90-R, and self-esteem, such as the Self-Esteem Inventory) (Cuzzolaro et al. 2006). The 34 items of part A cover five subscales: weight phobia (8 items), body image concerns (9 items), avoidance (6 items), compulsive self-monitoring (6 items), and depersonalization (5 items); additionally, the 37 item of part B assess dissatisfaction related to specific body parts or functions. For the purpose of this study, only the total score of part A (Global Severity Index) was computed. Items are scored on a 0 (never) to 4

Table 1. *The coping strategies and their related dimensions according to the COPE inventory (Carver et al. 1989, Conti 1999, Carver 2013)*

Coping dimensions	Coping strategies
Problem-focused coping	Active coping (e.g. "I concentrate my efforts on doing something about it")
	Planning (e.g. "I make a plan of action")
	Suppression of competing activities (e.g. "I put aside other activities in order to concentrate on this")
	Restraint coping (e.g. "I restrain myself from doing anything too quickly")
	Use of instrumental social support (e.g. "I talk to someone who could do something concrete about the problem")
Emotion-focused coping	Emotional social support (e.g. "I try to get emotional support from friends or relatives")
	Reinterpretation and growth (i.e. "I try to grow as a person as a result of the experience")
	Acceptance (e.g. "I accept the reality of the fact that it happened")
	Denial (e.g. "I refuse to believe that it has happened")
	Turning to religion (e.g. "I try to find comfort in my religion")
Avoidant coping	Mental disengagement (e.g. "I daydream about things other than this")
	Behavioral disengagement (e.g. "I reduce the amount of effort I'm putting into solving the problem")
	Focus on and venting of emotions (e.g. "I feel a lot of emotional distress and I find myself expressing those feelings a lot")

(always) scale and higher scores correspond to higher dissatisfaction.

2.2.3. The Short-Form 36 Health Survey (SF-36)

The SF-36 is the most widely self-report questionnaire used to evaluate the impact of a variety of diseases and treatments on health related quality of life (HRQoL) (Ware and Sherbourne 1992, Apolone and Mosconi 1998). The Italian SF-36 showed good reliability (Cronbach's alpha: 0.77-0.93) and construct validity (principal component analysis explaining 62% of the variance) (Apolone and Mosconi, 1998). Furthermore, validation of the SF-36 in burn patients with different injury severity showed good concurrent validity with the Burn Specific Health Scale (Kildal et al. 2001) (Pearson's r: 0.37 – 0.76) and good construct validity (Total Burn Surface Area's regression coefficient: -0.122 to -0.516), along with sensitivity to changes occurring in the 6-month follow-up period (Moi et al. 2006, Edgar et al. 2010). The 36 items encompass eight subscales: 1) limitations in physical activities because of health problems (10 items); 2) limitations in usual role activities because of physical health problems (4 items); 3) limitations in usual role activities because of emotional problems (4 items); 4) bodily pain (2 items); 5) general mental health (psychological distress and well-being) (5 items); 6) limitations in social activities because of physical or emotional problems (2 items); 7) vitality (energy and fatigue) (4 items); 8) general health perceptions (5 items). In addition to the eight subscales, the physical health (including subscales 1, 2, 4 and 8) and mental health (including subscales 3, 5, 6, and 7) domains were also calculated according to accepted procedures. Domain scores are transformed in a 0-100 scale, where higher scores refer to higher HRQoL.

2.2.4. The Self-report Clinical Inventory revised (SCL-90-R)

The SCL-90-R is a 90-items questionnaire to assess presence and severity of psychopathological symptoms in general medicine settings and broadly validated in different clinical settings (Derogatis et al. 1973, Cassano et al. 1999). Items are grouped in nine subscales: obsessivity-compulsivity (10 items), interpersonal sensitivity (9 items), depression (13 items), anxiety (10 items), rage-hostility (6 items), somatization (12 items), phobic anxiety (7 items), paranoia (6 items), and psychoticism (10 items). All items are scored on a 0 (not at all) to 4 (severely) scale and averaged together to get subscales scores. Higher scores correspond to severe or highly frequent symptoms.

2.3. Data analyses

Analyses were carried out by using SPSS ver. 18. Since coping dimensions were reasonably normally distributed, student's t test and Pearson's correlation coefficient were applied to test their relation with categorical and continuous variables. Linear regression was used to assess the effect of the three coping dimensions and of the body image dissatisfaction total score on the physical and mental quality of life scores drawn from the SF-36.

The effect of coping dimensions on psychiatric symptoms was investigated using logistic regression, instead than linear regression, because the SCL-90-R subscales were highly skewed making log-transformation ineffective. Therefore, the SCL-90-R

subscales were divided in two discrete levels: the observations below the mean of each subscale were defined as the reference level or "absence of psychiatric symptoms", while the remaining observations were defined as "presence of psychiatric symptoms". Next, logistic regression were carried out to assess the effect of coping dimensions and body image dissatisfaction on psychopathology, adjusting for potential confounders when appropriate. Potential confounders were defined "a posteriori", as social and clinical variable that were related either with the predictors or the outcomes.

3. Results

3.1. Sample description

The study sample consisted of 69 burn patients. Participants to the study were equally distributed in gender (males n = 33, 47.8%) and had a mean age of 39.33 years (sd = 12.33). The years they spent in education were often fewer or equal to eight, corresponding to the middle high school diploma for the Italian education system (n=39, 56.5%) and the majority of the patients were employed at the time of the injury (n=46, 66.7%), while the remaining were students, retired, or long term unemployed. The mean Total Body Surface Area (TBSA) was 9.98% (sd = 4.68, range 4.5-18), five patients (7.2%) had full-thickness burns (vs. 92.8% of patients presenting less severe burns, i.e. 1st and 2nd degree burns), and 45 (65.2%) presented hand or face burns (vs. 34.8% of patients without hand or face burns). The major causes of burn were thermal (n = 22, 31.9%) or scald (n = 22, 31.9%), while only three (4.3%) had a chemical burn. Most of the injury occurred at home (n = 41, 59.4%), and the remaining accidents happened at work (n=14, 20.3%), in the street (n = 9, 13.0%), and in other places (i.e. in the countryside) (n = 5, 7.2%).

3.2. Use of coping strategies in the burn sample

Patients reported a wide range of coping strategies to cope with the burn trauma: reinterpretation and growth (identifying and then disputing irrational or maladaptive thoughts, in order to find more positive alternatives) and acceptance were most frequently used, while use of alcohol or drugs, denial, and humor were the strategies least applied (data not shown). Among the three dimensions, problem-focused and emotion-focused coping were the most common ways of coping (problem focused mean =2.64 (sd=0.39) vs. emotion-focused mean=2.71 (sd=0.42), t=-1.737, p=0.087) and were both more common than avoidant coping (mean=1.94 (sd=0.39), respectively t=13.316, p<0.001 and t=14.123, p<0.001). Emotion-focused coping was associated with presence of full-thickness burns, and avoidant coping positively correlated with the total burn surface area. No relation was found between coping dimensions and any other social or clinical variable (**table 2**).

Table 2. *Association of coping dimensions, body image dissatisfaction, and quality of life with social and clinical variables*

	Gender	**Age**	**Education**	**TBSA**	**Full-thickness burns**	**Hand or face burns**
	Male=33, female=36	Range: 18-64	≤8 years of education=30 > 9 years of education= 39	Range: 4.5-18	Without=64, With=5	Without=24, With=45
Problem-focused coping Range: 1.70-3.70	2.65 (0.33) vs. 2.63 (0.45) t=0.218, p=0.828	r=-0.006, p=0.961	2.63 (0.35) vs. 2.65 (0.44) t= -0.248, p= 0.805	r=0.043, p=0.725	2.62 (0.40) vs. 2.93 (0.32) t=-1.698, p=0.094	2.62 (0.41) vs. 2.66 (0.40) t=-0.383, p=0.703
Emotion-focused coping Range: 1.70-3.85	2.71 (0.39) vs. 2.73 (0.46) t=-0.224, p=0.823	r=0.033, p=0.786	2.71 (0.37) vs. 2.73 (0.47) t= -0.223, p= 0.824	r=-0.054, p=0.660	**2.67 (0.40) vs. 3.32 (0.24) t=-3.559, p=0.001**	2.63 (0.39) vs. 2.77 (0.44) t=-1.306, p=0.196
Avoidant coping Range: 1.25-3.42	1.89 (0.42) vs. 1.98 (0.37) t=-0.922, p=0.360	r=0.059, p=0.630	1.87 (0.32) vs. 1.99 (0.44) t= -1.204, p= 0.233	**r=0.293, p=0.014**	1.91 (0.35) vs. 2.27 (0.73) t=-1.980, p=0.052	1.95 (0.48) vs. 1.93 (0.35) t=0.217, p=0.829
Body Image Dis-satisfaction Range: 0.00-3.06	0.27 (0.27) vs. 0.46 (0.59) t=-1.738, p=0.087	r=-0.159, p=0.191	0.34 (0.33) vs. 0.39 (0.56) t= -0.461, p= 0.646	r=0.137, p=0.263	0.38 (0.49) vs. 0.30 (0.21) t= 0.342, p=0.733	0.45 (0.64) vs. 0.33 (0.36) t=1.047, p=0.299
Physical quality of life Range: 17.31-55.04	**39.13 (6.27) vs. 34.23 (7.79) t=2.859, p=0.006**	r=-0.183, p=0.132	35.47 (8.01) vs. 37.42 (7.01) t= -1.075, p= 0.286	**r=-0.257, p=0.033**	36.09 (7.49) vs. 42.73 (3.82) t=-1.953, p=0.055	**33.69 (8.08) vs. 38.11 (6.72) t=-2.425, p=0.018**
Mental quality of life Range: 26.5-62.54	46.40 (6.79) vs. 46.70 (9.54) t=-0.146, p=0.884	r=0.056, p=0.650	48.39 (7.33) vs. 45.14 (8.78) t= 1,635, p= 0.107	r=-0.139, p=0.254	46.50 (8.31) vs. 47.31 (8.84) t=-0.209, p=0.835	47.13 (9.08) vs. 46.25 (7.91) t=0.419, p=0.677

Significant associations in bold.

Table 3. *Association of psychiatric symptoms with social and clinical variables*

	Gender	Age	Education	TBSA	Full-thickness burns	Hand or face burns
	Male=33, female=36	Range: 18-64	≤8 years of education=30 > 9 years of education= 39	Range: 4.5-18	Without=64, With=5	Without=24, With=45
Obsessivity Without= 45, with= 24	9 (27.3%) vs. 15 (41.7%) $\chi^2 = 1.573$, p= 0.210	41.07 (11.97) vs. 36.08 (12.58) t=1.618, p=0.110	9 (30.0%) vs. 15 (38.5%) $\chi^2 = 0.535$, p= 0.464	9.90 (4.76) vs. 10.13 (4.64) t=-0.189, p=0.851	21 (32.8%) vs. 3 (60.0%) Fisher test's p= 0.333	9 (25.0%) vs. 18 (40.0%) $\chi^2 = 1.552$, p= 0.213
Interpersonal sensitivity Without=48, with=21	10 (30.3%) vs. 11 (30.6) $\chi^2 = 0.001$, p=0.982	**41.31 (12.31) vs. 34.81 (11.40) t=2.064, p=0.043**	8 (26.7%) vs. 13 (33.3%) $\chi^2 = 0.356$, p= 0.551	9.75 (4.39) vs. 10.50 (5.39) t=-0.609, p=0.545	20 (31.2%) vs. 1 (20.0%) Fisher test's p= 1.000	8 (33.3%) vs. 13 (28.9%) $\chi^2 = 0.146$, p=0.702
Depression Without=42, with=27	9 (27.3%) vs. 18 (50%) $\chi^2 = 3.734$, p=0.053	38.98 (12.21) vs. 39.89 (12.73) t=-0.298, p=0.767	11 (36,7%) vs. 16 (41.0%) $\chi^2 = 0,135$, p= 0,713	9.64 (4.72) vs. 10.50 (4.67) t=-0.739, p=0.462	23 (35.9%) vs. 4 (80.0%) Fisher test's p= 0.073	13 (54.2%) vs. 14 (31.1%) $\chi^2 = 3.493$, p= 0.062
Anxiety Without=41, with=28	13 (39.4%) vs. 15 (41.7%) $\chi^2 = 0.037$, p=0.848	39.00 (11.95) vs. 39.82 (13.08) t=-0.270, p=0.788	9 (30.0%) vs. 19 (48.7%) $\chi^2 = 2.464$, p= 0.116	9.33 (4.54) vs. 10.93 (4.81) t=-1.402, p=0.166	25 (39.1%) vs. 3 (60.0%) Fisher test's p= 0.389	11 (45.8%) vs. 17 (37.8%) $\chi^2 = 0.421$, p= 0.516
Hostility Without=40, with=29	12 (36.4%) vs. 17 (47.2%) $\chi^2 = 0.833$, p=0.361	40.70 (12.21) vs. 37.45 (12.46) t=1.083, p=0.283	11 (36.7%) vs. 18 (46.2%) $\chi^2 = 0.626$, p= 0.429	10.58 (4.95) vs. 9.16 (4.25) t=1.247, p=0.217	27 (42.2%) vs. 2 (40.0%) Fisher test's p= 1.000	10 (41.7%) vs. 19 (42.2%) $\chi^2 = 0.002$, p= 0.964
Somatization Without=45, with=24	8 (24.2%) vs. 16 (44.4%) $\chi^2 = 3.098$, p=0.078	39.29 (12.04) vs. 39.42 (13.12) t=-0.041, p=0.968	10 (33.3%) vs. 14 (35.9%) $\chi^2 = 0.049$, p= 0.825	9.80 (4.82) vs. 10.31 (4.50) t=-0.430, p=0.669	21 (32.8%) vs. 3 (60.0%) Fisher test's p= 0.333	8 (33.3%) vs. 16 (35.6%) $\chi^2 = 0.034$, p= 0.854
Phobia Without=48, with=21	7 (21.2%) vs. 14 (38.9%) $\chi^2 = 2.541$, p=0.111	39.75 (11.84) vs. 38.38 (13.64) t=0.422, p=0.675	11 (36.7%) vs. 10 (25.6%) $\chi^2 = 0.974$, p= 0.324	9.38 (4.34) vs. 11.36 (5.25) t=-1.637, p=0.106	21 (32.8%) vs. 0 (0.0%) Fisher test's p= 0.313	8 (33.3%) vs. 13 (28.9%) $\chi^2 = 0.146$, p= 0.702
Paranoia Without=50, with=19	9 (27.3%) vs. 10 (27.8%) $\chi^2 = 0.002$, p=0.963	39.86 (12.74) vs. 37.95 (11.39) t=0.573, p=0.569	7 (23.3%) vs. 12 (30.8%) $\chi^2 = 0.470$, p= 0.493	**9.18 (4.26) vs. 12.08 (5.21) t=-2.372, p=0.021**	16 (25.0%) vs. 3 (60.0%) Fisher test's p= 0.124	8 (33.3%) vs. 11 (24.4%) $\chi^2 = 0.620$, p= 0.431
Psychoticism Without=51, with=18	7 (21.2%) vs. 11 (30.6%) $\chi^2 = 0.780$, p=0.377	38.47 (11.56) vs. 41.78 (14.37) t=-0.978, p=0.332	8 (26.7%) vs. 10 (25.6%) $\chi^2 = 0.009$, p= 0.923	9.44 (4.61) vs. 11.50 (4.69) t=-1.622, p=0.110	17 (26.6%) vs. 1 (20.0%) Fisher test's p= 1.000	6 (25.0%) vs. 12 (26.7%) $\chi^2 = 0.023$, p= 0.881

Significant associations in bold.

3.3. Effect of coping strategies and body image dissatisfaction on quality of life

On a 0-100 scale, patients evaluated their mental quality of life (mean=46.55, sd=8.28) better than their physical quality of life (mean=36.57, sd =7.46, t= -6,565, p<0.001). Worse physical quality of life was associated with female gender, presence of hand or face burns, and negatively correlated with TBSA. No association was found between the mental component of quality of life and any social or clinical variable (**table 2**).

Linear regression was used to assess the effect of coping dimensions and body image dissatisfaction on the physical and mental component of the SF-36. Gender, TBSA, and presence of hand or face burns were included only in the model of the physical component as potential confounders. Neither coping nor body image dissatisfaction were related to physical quality of life, with only gender showing a significant effect (B = -4.838, 95% CI -8.474 to -1.201, t = -2.660, p= 0.009), explaining about 15% of the variance (F = 2.669, p = 0.0178, adj. R^2 = 0.147). On the other hand, avoidant coping predicted a worse mental quality of life (B = -7.500, 95% CI -12.869 to -2.133, t = -2.791, p =0.006),

explaining 13% of the variance (F = 3.510, p = 0.012, adj R^2 = 0.128). However, body image dissatisfaction was not significantly related to mental quality of life.

3.4. Psychiatric symptoms and their relation with coping strategies and body image dissatisfaction

Somatization, anxiety, obsessivity, and depression were the most common psychiatric symptoms in this sample, while paranoid ideation, interpersonal sensitivity, and psychoticism were the least frequent (data not shown). Interpersonal sensitivity was associated with younger age and paranoid ideation was related with TBSA (**table 3**).

Multiple logistic regression were carried out to evaluate the effect of coping dimensions (problem-focused, emotion focused, and avoidance) and body image dissatisfaction on psychopathology, adjusting for potential confounders when appropriate (specifically, adjusting the model of interpersonal sensitivity for age, and adjusting the model of paranoia for TBSA). After controlling for the effect of the other coping dimensions, avoidant coping predicted symptoms of obsessivity, depression, anxiety, and psychoticism. Moreover, body image dissatisfaction significantly affected the odds for several psychiatric symptoms: obsessivity, depression, anxiety, hostility, and somatization (**table 4**). No significant predictor was found for interpersonal sensitivity and paranoia, while the model of phobic symptoms was not statistically significant (χ^2=8.921, p=0.063).

4. Discussion

This cross-sectional study explored the use of coping strategies following minor burn accidents and the relation with quality of life and psychopathological symptoms, taking account of body image dissatisfaction. Consisting with the literature (Kildal et al. 2005), we found that problem-focused and emotion-focused strategies were more frequently applied than avoidant strategies, such as alcohol or drugs use, denial, and mental or behavioral disengagement. Interestingly, controlling for the effect of other coping dimensions and potential confounders, avoidant coping was significantly related to poor mental quality of life. This is largely consistent with a previous study (Willebrand et al. 2004), that reported an association between avoidant coping strategies and lower scores in several subscales of the Burn Specific Health Scale – Brief (BSHS-B), particularly those related with mental quality of life (i.e. Interpersonal relationship, Affect, Body image, and Sexuality). Moreover, qualitative research described how behavioral and mental disengagement strategies (including ignoring the pain, avoiding looking at the body, or increasing working activity) were often applied by patients who experience a poorer adjustment to daily life and strong feeling of powerlessness (Dahl et al. 2012). Conversely, use of problem-focused and emotion-focused strategies (i.e. active coping, reframing, social support, humor, and spirituality) and acceptance of body changes were related with better quality of life in a mixed sample of informants affected by various types of body disfigurement (Egan et al. 2011). A study on the general population suggested that avoidant strategies might result in increased levels of alexithymia, which is the difficulty in recognizing and expressing feelings, distinguishing them from bodily sensations (Bilotta et al. 2015). In turn, alexithymia predicted poor quality of life in several studies on different clinical populations, including patients with chronic hepatitis C (Cozzolongo et al. 2015), breast cancer (Marrazzo et al. 2016), and Inflammatory Bowel Diseases (La Barbera et al. 2017). Thus, it might be speculated that the effect of avoidant strategies on quality of life could be mediated by alexithymia; obviously, further investigations are needed in order to test this hypothesis.

The second finding of this study regards the association between post-burn psychopathology, body image dissatisfaction and coping strategies. In addition to anxiety and depression symptoms, which have been widely documented in patients with various degrees of burn injuries (Shakespeare 1998, Tedstone et al. 1998, Esselman et al. 2006, Thombs et al. 2006), the participants to our study referred also somatization and obsessivity. These symptoms were described in the long-term course of burn patients and associated with poor quality of life, pain, and paresthetic sensations (Altier et al. 2002, Van Loey and Van Son 2003). Again, we found that avoidant coping had a stronger negative effect than other dimensions on psychopathology, being related with symptoms of obsessivity, depression, anxiety, and psychoticism. Previous studies showed that avoidant coping correlated with the total score of the Brief Symptoms Inventory one month after burn (Ptacek et al. 1995). Moreover, use of avoidant strategies predicted depression and anxiety at the 3 months follow-up (Willebrand et al. 2004). Along with avoidant coping, we found that body image dissatisfaction was significantly associated with several psychiatric symptoms, specifically with obsessivity, depression, anxiety, hostility, and somatization. Another research group have already reported an association between body image dissatisfaction and depressive and post-traumatic symptoms (Fauerbach et al. 2000), but to our knowledge this is the first study suggesting that

Table 4. *Effect of coping dimensions and body image dissatisfaction on psychiatric symptoms*

SCL-90-R	Predictors	OR (95% CI)	χ^2 (p value)	Nagelkerke R^2
Obsessivity	Avoidant coping BID	7.46 (1.25-44.25) 7.44 (1.26-43.85)	19.943 (0.001)	0.339
Depression	Avoidant coping BID	10.52 (1.46-75.95) 12.38 (1.60-95.59)	22.901 (<0.001)	0.383
Anxiety	Avoidant coping BID	10.41 (1.23-88.31) 13.09 (1.60-106.83)	22.028 (<0.001)	0.437
Hostility	BID	8.66 (1.31-57.22)	14.075 (0.007)	0.248
Somatization	BID	6.26 (1.15-34.14)	11.450 (0.022)	0.210
Psychoticism	Avoidant coping	10.82 (1.61-72.59)	13.004 (0.011)	0.252

BID: body image dissatisfaction. Predictors are in fact significant predictors (p<0.05).

body image concerns, compulsive self-monitoring, and depersonalization have such a large impact on post-burn psychopathology. Furthermore, Partridge (1998) and Thombs et al. (2008) suggested that body image distress plays a key role in the long-term post-burn adjustment (12-24 months), when patients who have already coped with burn recovery and rehabilitation, supported by health professionals and family members, began to face their physical changes as well as the reactions of other people to disfigurement, and struggle to reconstruct their social network.

In conclusion, the results of this study remark the role of coping strategies in modulating the psychological adjustment and the psychopathological morbidity in the very early stage of burn recovery and rehabilitation. Beyond the effect of coping, body image distress significantly contributed to worsen psychological outcome. Although a large body of literature has investigated the psychological and psychopathological of severe burn trauma, less is known about the course of minor burns, which, however, often represents a relevant part of service users. Involving patients from one of the reference center in the south of Italy, this study contributes to generalize previous findings (Fauerbach et al. 2002, Willebrand et al. 2004, Braš et al. 2007) to a broader population.

The main drawback of this study is lack of information about pre-burn quality of life as well as about long term psychosocial adjustment. Since this was a cross-sectional study, we were not able to investigate whether coping strategies and body image dissatisfaction experienced by the patients at the time of the injury truly predict a poor quality of life and psychiatric symptoms. Nevertheless, having excluded patients with self-referred pre-burn psychiatric disease, we could be reasonably confident in the fact that any symptoms reported at the SCL-90-R truly reflect post-burn psychopathology.

Although this study did not provide any information regarding the protective role of more effective coping, earlier studies suggested that problem-focused and emotion-focused strategies were associated with a better adjustment (Tedstone et al. 1998, Willebrand et al. 2001, Kildal et al. 2005). In their qualitative study, Kornhaber and colleagues (2014) suggested that reasoning, humor, and acceptance are coping strategies often used by burn patients to come to terms with their altered body image: making downward comparisons with people affected by more severe burns helped patients to positively reframe their own conditions, while humor contributed to decrease stress and facilitated interpersonal relationships. In addition, also social support has an important role in rehabilitation, by providing motivation to recovery, personal empowerment, and hope for the future (Kornhaber et al. 2014). Developing psychological intervention for burn patients is univocally recognized as a top research priority in burn care and rehabilitation (Esselman et al. 2006, Fauerbach et al. 2007), and burn patients who received psychological care tend to achieve a satisfactory quality of life, comparable to the general population (Di Pasquale et al. 2002, Cavaleri et al. 2009). Moreover, preliminary evidence reported the efficacy of cognitive-behavioral therapy programs (including psychoeducation, relaxation, desensitization, cognitive restructuring, and development of coping strategies) in improving quality of life and community integration, and reducing PTSD symptoms of burn patients (Cukor et al. 2015, Seehausen et al. 2015). This study suggests that coping training should be part of psychological care for burn patients, from the very early stage of the rehabilitation process.

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