

Self-Help Stress Management Training Through Mobile Phones: An Experience With Oncology Nurses

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Daniela Villani

Catholic University of Milan

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Alessandra Grassi

Catholic University of Milan and Istituto
Auxologico Italiano, Milan, Italy

Chiara Cognetta

Catholic University of Milan

Davide Toniolo

G. Salvini General Hospital, Rho, Italy

Pietro Cipresso

Istituto Auxologico Italiano, Milan, Italy

Giuseppe Riva

Catholic University of Milan and Istituto
Auxologico Italiano, Milan, Italy

Although all professions are susceptible to work-related stress, the nursing profession has been identified as particularly stressful; indeed, oncology nursing is often described as being among the most stressful specialty areas. The current study tested the short-term effects of an innovative self-help stress management training for oncology nurses supported by mobile tools. The sample included 30 female oncology nurses with permanent status employed in six oncology hospitals in Milan, Italy. The stress inoculation training (SIT) methodology served as the basis of the training, with the innovative challenge being the use of mobile phones to support the stress management experience. To test the efficacy of the protocol, the study used a between-subjects design, comparing the experimental condition (SIT through mobile phones) with a control group (neutral video through mobile phones). The findings indicated psychological improvement of the experimental group in terms of anxiety state, anxiety trait reduction, and coping skills acquisition. This paper discusses implications for the implementation of this protocol in several contexts.

Keywords: stress inoculation training, nursing, mobile phone, mediated experience, self-help intervention

Although all professions are susceptible to work-related stress, researchers have determined that the nursing profession is particularly

stressful (Numerof & Abrams, 1988). Indeed, scholars often describe oncology nursing as among the most stressful specialty areas (Lederberg, 1989) due to the frustration deriving from the nurses' inability to provide quality of care consistent with professional standards. Oncology nurses are especially vulnerable to several related effects, such as burnout and job dissatisfaction (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Browning, Ryan, Thomas, Greenberg, & Rolniak, 2007; Greco, Laschinger, & Wong, 2006; McVicar, 2003), increased interpersonal problems (Schmitz, Neumann, & Opperman, 2000), increased health complaints (Ingersoll, Olsan, Drew-Cates, DeVinney, & Davies, 2002), disturbances in sleep patterns, and clinical depression and anxiety (Ruggiero, 2005). Several studies have found an association among nurses between

Daniela Villani, Department of Psychology, Catholic University of Milan, Milan, Italy; Alessandra Grassi, Department of Psychology, Catholic University of Milan and Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano, Milan, Italy; Chiara Cognetta, Department of Psychology, Catholic University of Milan, Milan, Italy; Davide Toniolo, Department of Medical Oncology and Ematology, G. Salvini General Hospital, Rho, Italy; Pietro Cipresso, Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano, Milan, Italy; and Giuseppe Riva, Department of Psychology, Catholic University of Milan and Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano, Milan, Italy.

Correspondence concerning this article should be addressed to Daniela Villani, PhD, Department of Psychology, Catholic University of Sacred Heart, Milan, Italy. E-mail: daniela.villani@unicatt.it

psychological disorders and job demands, job latitude, and social support at work (Ingersoll et al., 2002; Peeters & Le Blanc, 2001; Van Yperen & Hagedoorn, 2005), which are considered to be the three most studied characteristics of the work environment that may contribute to the incidence of health problems—both physical and psychological—among workers.

Karasek's job strain model postulates that health problems are associated with job strain resulting from the combination of high psychological demands and low decision latitude at work (Karasek & Theorell, 1990). Meanwhile, social support—namely, helpful social interactions available on the job from coworkers and supervisors—is hypothesized to reduce the effect of job strain on health (Johnson, Hall, & Theorell, 1989; Karasek & Theorell, 1990). An Italian health care professional study (Klersy et al., 2007) demonstrated that an important consequence of burnout is poor quality of life.

Based on existent literature, health care professionals clearly need support in addressing the numerous stressors inherent in their work. Most individual-level strategies (Bennet, Lowe, Matthews, Dourali, & Tattersall, 2001; Payne, 2008) aimed at reducing burnout are well established and have a long and successful history in clinical and health psychology. Such strategies seek either to increase workers' awareness or to reduce the high level of negative arousal that characterizes stress in general. Strategies frequently used to reduce negative arousal include relaxation techniques, promotion of a healthy lifestyle (e.g., physical training), and cognitive-behavioral techniques (e.g., stress inoculation therapy, rational emotive therapy, cognitive restructuring, and behavioral rehearsal). Cognitive-behavioral techniques are particularly relevant because burnout often includes unrealistic expectations and false hopes (Schaufeli & Buunk, 2003). Empirical evidence has demonstrated that some of these individual-level strategies are effective in reducing burnout.

Several studies have shown that skills training, such as in the form of stress inoculation training (SIT; Meichenbaum, 1977, 1985), may lead to a reduction in burnout levels by altering the way in which an individual processes information about stressful situations and by identifying cognitive, emotional, and behavioral coping skills to change unproductive ways of reacting. SIT is a short and structured program

that includes three phases. The conceptual phase aims to make clients aware of the transactional nature of stress. The skill acquisition and rehearsal stage aims to teach clients to manage emotions and maladaptive behaviors as well as learn new coping skills (Lazarus, 2000, 2006). Finally, the application and follow-through phase aims to increase self-efficacy (Bandura, 2005) through imaginative exercises and simulations. SIT usually employs techniques such as imagery and behavioral rehearsal, modeling, role-playing, and graded in vivo exposure in the form of "personal experiments."

In particular, West, Horan, and Games (1984) showed the efficacy of SIT on work stress management among 60 nurses. According to Meichenbaum (1977, 1985), SIT can be proposed in a self-instructional approach with the goal of helping clients develop internal mediators to self-regulate coping responses. Following this perspective, Litz, Engel, Bryant, and Papa (2007) designed a modified SIT intervention based on applied coping and self-care to counteract avoidance and withdrawal in victims of trauma.

Thanks to the self-help approach, it is possible overcome some limits related to the traditional treatment application among oncology nurses. Although psychotherapy requires significant professional training and expertise to administer, as well as patient time and resources, ample justification exists for considering self-management and telehealth-based treatments to enhance treatment fidelity, effectiveness, and accessibility (Taylor & Luce, 2003). Indeed, technological advancements in telecommunications have provided the means for effective distance surveillance and support for behavioral health care, and the use of this modality as an adjunct or stand-alone treatment is gaining acceptance (Ackerman et al., 2010; Cusack et al., 2008; Oliver & Demiris, 2010; VandenBos & Williams, 2000).

In this context an important role may be played by the mobile phone (World Health Organization, 2011) that can respond to various clinical needs (Preziosa, Grassi, Gaglioli, & Riva, 2009). In the case of a self-help stress management training for oncology nurses, we considered that the mobile phone may:

(1) allow the incremental acquisition of key factors—namely, resilience, and coping

skills—to cope with everyday situations in an autonomous way (Storr, 1990);

(2) guarantee the availability of the contents at anytime and in any place, enhancing patients' acceptance (Cleland, Caldwell, & Ryan, 2007); and,

(3) support graded exposure experiences, overcoming the difficulties related to the application of coping techniques within the hospital as well as the not-graded exposure to real stressors.

The use of mobile phone for anxiety management was already tested by Preziosa and colleagues (2009), obtaining encouraging results.

Considering these critical factors, the current study tests the short-term effects of an innovative self-help stress management training based on the SIT approach and supported by mobile tools for oncology nurses. In particular, the study aims to test the following hypotheses:

Hypothesis 1. We expected an improvement of the emotional state (state anxiety reduction) of the experimental group by the end of each session of the protocol.

Hypothesis 2. We expected an improvement of the affective state (trait anxiety reduction and acquisition of coping skills) of the experimental group by the end of the entire protocol.

Method

Participants

Recruitment consisted of posting flyers in six day-hospital medical oncology wards in Milan (Italy) and sending out e-mails describing the free stress management program supported by mobile tools for oncology nurses. The flyers and e-mails explained that the intention of the program was to learn about strategies to cope with stress. Thirty-eight participants responded to the e-mail and flyers. Inclusion criteria included (1) being a current oncology nurse with a minimum of 5 years of experience in the oncology ward and (2) having a permanent status, to avoid sources of stress related to temporary employment. Ultimately, 30 female oncology nurses (Mean [*M*]age = 43; standard deviation [*SD*] = 8.80) enrolled in the study, with an average of 22 years of experience as a nurse and 9 years of experience in the oncology ward. As participants might feel more engaged if they consider

the experience to be relevant for their needs and goals (Scherer, 2001), which is true for mediated experiences as well (Villani & Riva, 2009; Villani, Riva, & Riva, 2007), this study focused on participants with a cut-off level of stress corresponding to the higher quartile (Italian normative data), measured using the *Mesure du Stress Psychologique* (MSP) Questionnaire (Di Nuovo, Rispoli, & Genta, 2000; Tessier, Lymyre, & Fillion, 1990). Nurses voluntarily participated in the experiment after completing the informed consent form.

Measures

To achieve an integrated assessment of stress, combining the anxiety level, work components, perceived stress, and coping skills, several questionnaires were used.

Mesure du Stress Psychologique

The MSP (Di Nuovo et al., 2000), which is a self-report measure, was used to evaluate stress levels perceived within the 3 months preceding the study in order to select nurses according to a specific cut-off level of stress. The MSP includes 49 items and considers six dimensions: loss of control and irritability, psychophysiological feelings, sense of effort and confusion, depressive anxiety, pain and physical problems, and hyperactivity and accelerated behaviors (Cronbach's alpha of the Italian-validated version is 0.95; test-retest stability between .68–.80). The MSP has been translated into different languages (i.e., English, Japanese, Italian) and these versions maintain the same heuristic statistics, normality of distribution, and responsiveness of original version (Tessier et al., 1990).

State Trait Anxiety Inventory

The State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) is a 40-item self-reported instrument widely used in anxiety disorders research (Barlow, 1988). It is broken down into two sections: state (or current) and trait (or characteristic or chronic) anxiety. These two sections are essentially identical, with the exception of the preface to each question (i.e., "right now" vs. "in general"). The current study considered the state version to verify the reduction of anxiety achieved at the

end of each session and the trait version to verify the reduction of anxiety achieved at the end of the entire treatment. This measure has good internal consistency (Ramanaiah et al., 1983) and good concurrent validity (Spielberger & Vagg, 1984). The Italian versions of the STAI have been validated (Lazzari & Pancheri, 1980). Cronbach's alpha of the subscales' Italian-validated versions ranges between 0.83 and 0.92.

Coping Skills

We were interested in evaluating coping skills in terms of active coping and denial. Considering that for these dimensions there is not an Italian-validated version of a specific coping questionnaire, we used the Italian translation of four items of the Brief Coping Orientation to Problems Experienced (COPE) questionnaire (Carver, 1997). Specifically, we used the two questions "I've been concentrating my efforts on doing something about the situation I'm in" and "I've been taking action to try to make the situation better" to evaluate active coping and the two questions "I've been saying to myself 'this isn't real'" and "I've been refusing to believe that it has happened" to evaluate a denial style of coping.

Job Content Questionnaire

Finally, the Job Content Questionnaire (JCQ) proposed by Karasek and Theorell (1990) comprises 35 items evaluating job content in terms of psychological job demands, job decision latitude, and social support. Job decision latitude (DL) refers to the individual's perception of autonomous decision making at work. The psychological job demand (PJD) investigates the workload, job demand, and gap between personal skills and job challenges. Social support at work (SSW) investigates the relationship among colleagues and between nurses and their boss. Cronbach's alpha of this version ranged from 0.72 for PJD to 0.88 for SSW. Assumptions for external validity were satisfied in both gender groups.

Research Design

The study included two phases: the needs analysis and the self-help intervention phase. The aim of needs analysis was to explore the

communicative and relational competences of nurses, related to bad news communication management and adaptation to work, and to explore perceived stress effects (physiological, psychological, and behavioral effects). This first part of the experiment resulted in the creation of an intervention protocol supported by mobile tools and corresponding to the real needs of oncology nurses.

To test the efficacy of the Mobile Stress Inoculation Training (M-SIT), a between-subjects design was used to compare the experimental condition with a control group. Participants were randomly allocated into two groups (15 participants for each condition). In the experimental condition, participants watched eight video clips with a narrative created ad hoc according to SIT using UMTS mobile phones. In the control condition, participants watched eight neutral video clips (Gross & Levenson, 1995) without any narrative using UMTS mobile phones. The background music was the same in both conditions. Meanwhile, to test the within-subjects results, different moments within the treatment were considered by comparing the beginning and end of each session, as well as the beginning and end of the entire treatment.

Procedure

Meanwhile, the self-help intervention phase lasted 4 weeks. During this time, all participants watched eight multimedia videos through different media, twice a week. For the experimental group (M-SIT), the self-help intervention was created according to the SIT procedure (Meichenbaum, 1977). The skills acquisition and rehearsal phase was combined with two kinds of relaxation techniques: the Progressive Muscular Relaxation (PMR; Jacobson, 1938) and Autogenic Training (AT; Schultz, 1977). PMR (Jacobson, 1938) aims to decrease the physiological aspects of anxiety by distracting individuals from their awareness of anxious feelings. AT (Schultz, 1977) explores the effectiveness of a relaxation training based on the individual's ability to control the body through mind exercises.

The flow diagram (see Figure 1) shows the protocol according to each phase, its aim and the multimedia content proposed during the sessions (from T1 to T8). During the baseline session, all participants completed the same

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F1

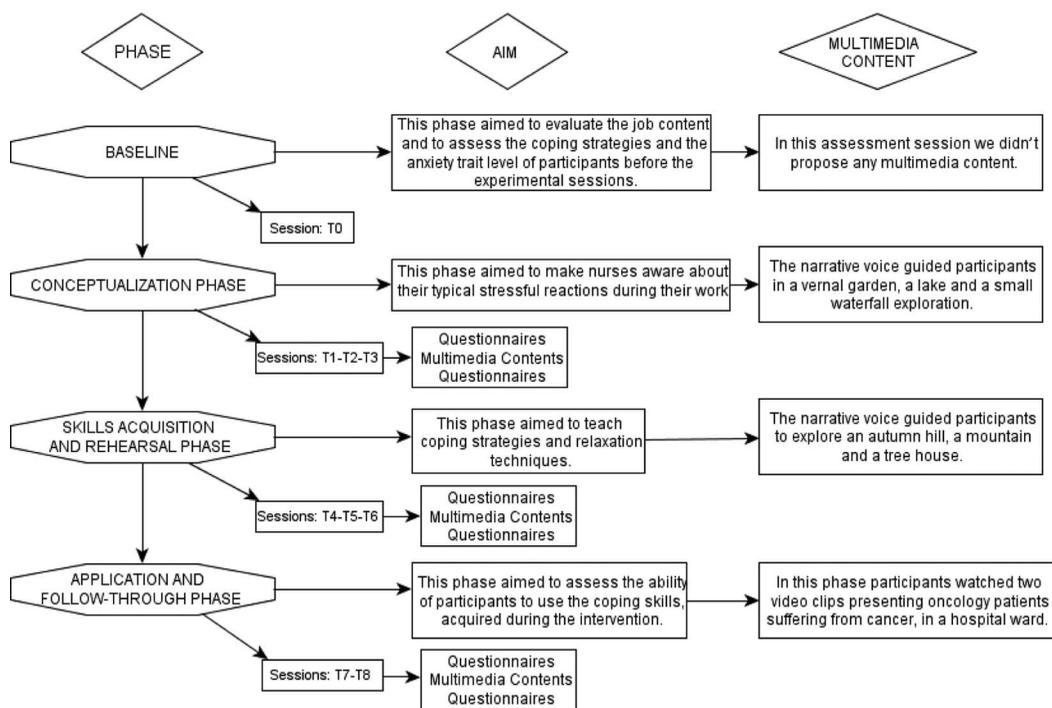


Figure 1. Protocol diagram flow.

questionnaires (Trait Anxiety subscale, Job Content Questionnaire, and items related to coping skills). From Session T1 to Session T8, all participants completed the STAI state questionnaire both before and at the end of each session, to allow a pre–post session comparison.

Each session was made up of the presentation of a video. The first six audio–video clips for the experimental group were developed using the “Just Leap In” platform (available for free at www.justleapin.com) and showed a relaxing virtual environment (see Figure 2 for an example). The two last video clips presenting oncology patients suffering from cancer (see Figure 3 for an example) were developed by combining three different public social advertising campaigns (available from www.pubblicitaprogresso.it).

The control group (CTRL) followed the same procedure and completed the same number of sessions, although the eight video clips represented natural environments (see Figure 4) and were previously validated as neutral stimuli by Gross and Levenson (1995).

For both groups, each session lasted approximately 15 min and participants used Nokia

(N70 model) mobile phones with a display resolution of 176×208 pixels and headphones to watch the audio–video clips.

Results

Analytical Approach

The data were analyzed using Statistical Package for the Social Sciences (SPSS, version 18, IBM, Armonk, NY). First, a descriptive



Figure 2. Relaxation environment.

F2

F3

F4



Figure 3. Stressful video.

analysis was conducted of the job content in the sample. Then, to analyze treatment differences related to the anxiety state scores for the two conditions, a two-way multivariate analysis of variance (MANOVA) was performed with one between-subjects factor (condition) and one within-subjects factor (time). Whether the interaction effect existed between the degree of change achieved and the experimental condition was also evaluated. Affective changes in terms of trait anxiety and coping skills were analyzed by comparing Student's *t* tests (paired samples) to initial (T0) and final (T8) scores as this study did not aim to evaluate interaction effects related to Time \times Condition.

Job Content Description

The data analysis of the JCQ responses indicated that the DL perceived by nurses was relatively low ($M = 25$, $SD = 2.30$). Considering the kind of job and patients' features, these data were strictly related to the low perception of autonomous decision making at work. Furthermore, the data indicated a high level of PJD ($M = 30.3$, $SD = 3.60$), which is consistent with nurses heavy workload. Indeed, nurses engage with patients, relatives, doctors, and others, and the gap between job challenges—in terms of emotional and suffering experiences—and personal skills is consistently high. Nurses perceived a good relationship with colleagues and supervisors during their work, as confirmed by a high SSW value ($M = 12.31$, $SD = 1.78$). The quality of the working relationships with colleagues turned out to be of great importance for the well-being of oncology nurses. Consid-

ering the high level of SSW, this variable was not included in the training protocol.

State and Trait Changes

To verify the first hypothesis, related to anxiety state changes, a two-way MANOVA test was performed with one between-subjects factor (condition) and one within-subjects factor (time). The results indicated significant effects related to time (i.e., the cumulative changes pre- and postexperimental exposure to the eight sessions), condition (M-SIT and control group), and the interaction effect Time \times Condition, as shown in Table 1. In particular, from Figure 5 is possible to highlight the interaction effect Time \times Condition. These results suggest a significant difference between M-SIT and control group conditions related to anxiety state reduction. We analyzed also the changes achieved within each session and the Student's *t* tests (paired samples) demonstrated a significant and continuous decrease of anxiety state (STAI State) at the end of each session for the experimental group, but not for the control group, as shown in Table 2. The didn't find a significant decrease of anxiety state only for Session 7, during which—according to the application phase of SIT—participants watched the first stressing video, which included content that they likely did not expect. A more comprehensive explanation of this result will be explored in the Discussion.

As evident from the second hypothesis, an affective change was expected among the experimental group in terms of trait anxiety and coping skills at the end of the entire protocol. Performing Student's *t* tests (paired samples) again, significant



Figure 4. Neutral video (for the control group).

T1,F5

T2

Table 1
Results of Repeated Measures ANOVA With Anxiety State (STAI) Scores as the Dependent Variable

Sessions	Source of variance	Sum of squares	df	Mean squares	F	p	Observed power	Partial η^2
Eight sessions	Time	2,097.186	1.28	2,097.186	71.365	.000*	1.000	.238
	Time \times condition	807.447	1.28	807.447	27.476	.000*	0.999	.108
	Condition (between groups)	2,295.783	1.28	2,295.783	16.459	.000*	0.981	.067

* Significant results.

T3 results were found only for the experimental group, as indicated in Table 3. In particular, in terms of coping skills, active coping (taking action to change the situation) increased while denial (denying the existence of the critical situation and trying to act as if the stress does not exist) decreased. A significant decrease of anxiety trait measured by STAI Trait was also identified.

Discussion and Conclusion

The goal of this study was to test the short-term effects of an innovative self-help stress

management training for oncology nurses, supported by mobile tools. Nursing care has been defined as a difficult art that requires the nurse to supply what the patient needs to carry out activities of daily living and administer medical treatments prescribed by physicians (Henderson, 2007). The nurse is responsible for the constant surveillance of the patient as well as the safety of the surrounding patient care environment (Clarke & Aiken, 2003), including physiological and psychological assessments, medication and treatment administration, the ensuring of aseptic practices to prevent infec-

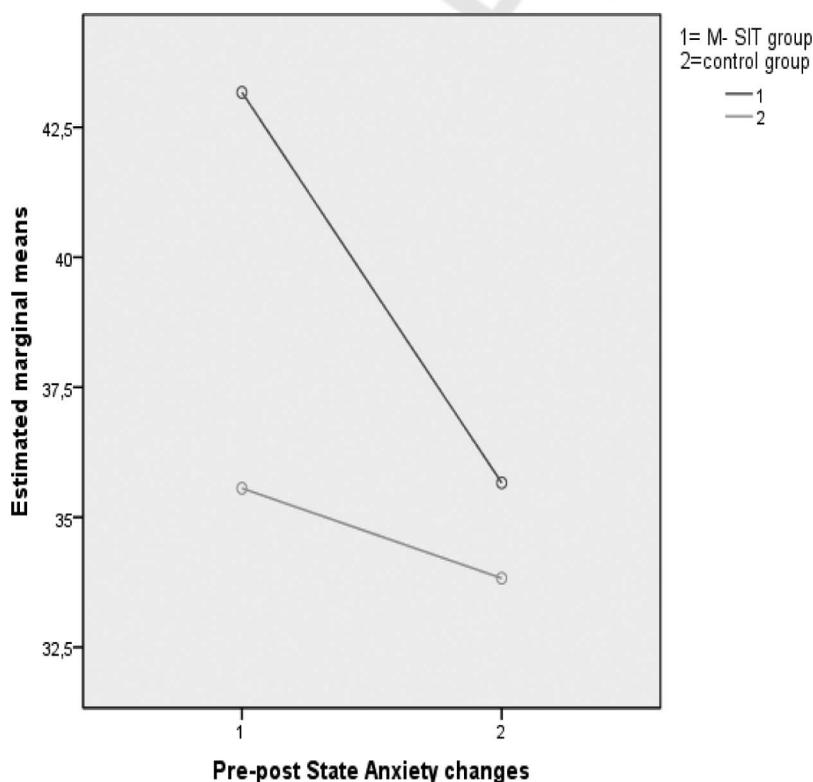


Figure 5. Anxiety reduction interaction effect Time \times Condition.

Table 2
Within-Groups Anxiety State Results: Comparison Between Pre and Post Session

Session	Group	Mean	SD	<i>t</i>	<i>p</i>
1	Experimental	Pre-post = 9.429	6.595	5.349	.000*
	Control	Pre-post = 3.077	5.979	1.856	.088
2	Experimental	Pre-post = 7.200	6.167	4.522	.000*
	Control	Pre-post = 2.714	6.269	1.620	.129
3	Experimental	Pre-post = 9.200	9.420	3.782	.002*
	Control	Pre-post = 3.000	5.292	2.121	.054
4	Experimental	Pre-post = 10.200	10.455	3.778	.002*
	Control	Pre-post = 1.429	3.956	1.351	.200
5	Experimental	Pre-post = 8.267	10.773	2.972	.010*
	Control	Pre-post = 0.214	4.191	0.191	.851
6	Experimental	Pre-post = 8.733	8.996	3.760	.002*
	Control	Pre-post = 0.143	3.739	0.143	.889
7	Experimental	Pre-post = -2.533	8.839	-1.110	.286
	Control	Pre-post = 2.286	7.216	1.185	.257
8	Experimental	Pre-post = 5.067	7.392	2.655	.019*
	Control	Pre-post = 0.214	5.250	0.153	.881

* Significant results.

tion, and the provision of comfort and pain control. As such, the work of nurses—especially oncology nurses—involves helping, in very intimate circumstances, people who are anxious, may be in pain, and are sometimes dying (Cimiotti, Aiken, & Poghosyan, 2008). The recognition of such work difficulties led to the development of a self-help intervention that directly targets aspects of nurses' management of stress. The key feature of this intervention, based on the SIT methodology (Meichenbaum, 1977), was represented by the use of mobile tools to increase patients' involvement and control in their treatment.

An increasing number of interventions have been developed to enable patients to manage their diseases more effectively. Such interventions, characterized by patients taking substantial responsibility, are commonly referred to as

self-management interventions (Newman, Steed, & Mulligan, 2004). The data from the current study highlighted the effectiveness of self-help stress management training supported by mobile tools. Specifically, results showed a significant decrease in anxiety among those who performed the SIT protocol as compared with the control group. In addition to the significant reduction in anxiety state at the end of each session, the results demonstrated a significant improvement in affective change in terms of anxiety trait reduction and coping skills acquisition. In particular, nurses learned two important coping strategies represented by the decrease of denial and the increase of active coping, intended as a set of actions aimed to change the situation. According to Rogers' (1983) protection-motivation theory, the increase of active coping refers to an adaptive

Table 3
Within-Groups Affective Changes Results: Comparison Between the Beginning and the End of the Training

Variable	Group	Mean	SD	<i>t</i>	<i>p</i>
Active coping (COPE)	Experimental	-.375	0.527	-2.462	.032*
	Control	.305	0.777	1.361	.201
Denial (COPE)	Experimental	.375	0.446	2.913	.014*
	Control	.229	0.588	1.349	.204
Anxiety Trait (STAI)	Experimental	2,643	4.361	2.268	.041*
	Control	1,857	5.628	1.235	.239

* Significant results.

coping strategy while the decrease of denial refers to a decrease of a maladaptive strategy.

As this is a preliminary study in the field, limitations due to the rather small sample size call for viewing the obtained results with caution. Furthermore, it is important to consider the fact that emotional and affective states were measured using only self-reporting questionnaires. Even if the assessment tools used were validated and effectively tested in different contexts, with the exception of coping skills questions, the use of physiological indices in the future may help obtain a more complete picture of the emotional response of the nurses.

Nevertheless, important clinical applications suggested by these results suggest the possibility of developing controllable self-help stress management-mediated experiences for several professions. Self-management training offers a potential solution to the demand for efficient, low-cost, and stigma-reducing interventions for stress, especially in high-demand professions (Litz et al., 2007). Significant efforts are still required to move self-help training with mobile tools into routine clinical use in stress management interventions. In particular, controlled trials are needed in order to compare the efficacy of this approach with competing methods as well as test the long-term effects achievable by the proposed approach.

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