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Does Social Problem-Solving Training Reduce Psychological Distress in Nurses Employed in an Academic Hospital?

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ABSTRACT

Fifteen nurses were randomly assigned to a problem-solving training (PST) and 20 to a waiting list control (WLC) conditions. Participants completed the measures of depression, perceived stress, social problem-solving, self-esteem and a training evaluation form. Post-training depression, perceived stress and negative problem orientation scale scores of the participants in the PST condition decreased significantly compared to the pre-training scores but post-waiting and pre-waiting depression and perceived stress scores of the participants in the WLC condition did not change. Post-training self-esteem scores of the participants within the PST condition increased significantly compared to the pre-training scores while post-waiting and pre-waiting self-esteem scores of the participants in the WLC condition did not change. The improvements were maintained at six months follow-up.
KEY WORDS: social problem-solving training, nurse, depression, stress, self-esteem

1. INTRODUCTION

Problem solving is an important coping resourse for dealing successfully with demands of life. Scientific evidence indicates that deficiency in problem solving is associated with poor psychological adjustment. Ineffective problem solvers report more depression, anxiety, alcohol use, suicidal behavior and other health problems [1, 2, 3, 4, 5, 6]. The diathesis-stress models of psychological distress assume that deficiency in problem solving combined with high life-stress leads to distress such as depression [7, 8, 9] and suicide [10, 11, 12, 13, 14, 15, 16].

Health care professionals such as nurses experience high levels of stress. Therefore, the prevalence of psychological distress is high in nurses [17, 18, 19, 20, 21, 22]. One study conducted with nursing students during their internship period found that 48% of the sample scored above a threshold indicative of distress on the General Health Questionnaire [23]. Another study with Taiwanese nurses found that 48.8% of the sample was identified as having a minor psychiatric disorder [24]. High workload, lack of control, ethical dilemmas [25], organizational restructuring [26], job dissatisfaction, and emotional exhaustion [27] were all shown to contribute to the feelings of distress in nurses. Stress and psychological distress may have negative influences on the recruitment and retention of nurses [28], job satisfaction, turnover and quality of nursing [27].

If a deficiency in problem solving is related to poor psychological adjustment, then restoring people's problem solving skills should alleviate the experience of psychological distress. As a cognitive behavioral intervention strategy, problem solving therapy or training [29, 30] is often used to reduce levels of psychological distress [31, 32, 33, 34, 35]. Problem solving training is also considered as a viable prevention, treatment and rehabilitation strategy in severe forms of mental health problems such as schizophrenia [36, 37], depression [38] and suicide [31, 39]. Meta-analytic and systematic reviews on the effectiveness of problem solving therapy for depression suggest that teaching people how to confrant and solve daily problems alleviates levels of depression [40, 41, 42].

Nursing is a stressfull profession that may result in problems in personal adjustment, recruitment, quality of nursing and retention of nurses. Systematic reviews on stress and nursing suggest a need for the documentation of the effectiveness of interventions reducing levels of psychological distress [43, 44]. Having these considerations in mind, the main objective of the present study was to test whether or not a cognitive behavioral problem solving training intervention was an effective strategy for reducing psychological distress in nurses working in an academic hospital.

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2. MATERIALS AND METHODS

Design

A randomized controlled trial was carried out to compare the effects of a social problem-solving training and a waiting list control conditions in reducing levels of psychological distress in a group of nurses employed at a university hospital.

Recruitment of participants

Upon a request from the head of the Intensive Care Unit (ICU), the nursing department of the Adnan Menderes University hospital has announced the study to nurses working at different units.

Participants

A total of 40 nurses responded affirmatively to the announcement made by the nursing department of the university hospital. Of 40 nurses, 20 were randomized to a problem solving training and 20 to a waiting list control condition. Five of 20 nurses randomized to problem solving training condition dropped out due to shift problems in their work schedules. Thus the total number of participants in the study was 35 nurses working in different units of Adnan Menderes University Academic Hospital.

The demographic characteristics of participants are given in Table 1. The two groups were similar on age ($t_{(33)} = 0.9$, $p > 0.05$), education ($t_{(33)} = 1.9$, $p > 0.05$), marital status ($\chi^2 = 0.3$, $df = 2$, $p > 0.05$), having child(ren) or not ($\chi^2 = 0.7$, $df = 1$, $p > 0.05$), perceived family income ($\chi^2 = 0.2$, $df = 2$, $p > 0.05$), working unit ($\chi^2 = 0.3$, $df = 2$, $p > 0.05$), and number of children ($t_{(33)} = 0.5$, $p > 0.05$).

Table 1: Demographic characteristics of participants.

Variables	Group											
	Problem Solving Training				Waiting List Control				Total			
	N	%	M	SD	N	%	M	SD	N	%	M	SD
N	15	42.9			20	57.1			35	100		
Marital status	10	66.7			15	75.0			25	71.4		
Married	4	26.7			4	20.0			8	22.9		
Single	1	6.7			1	5.0			2	5.7		
Divorced												
Have child(ren)	9	60.0			14	73.7						
Yes	6	40.0			5	26.3			23	67.6		
No									11	32.4		
Working unit	7	46.7										
Intensive care	1	6.7			10	52.6			17	50.0		
Internal medicine	4	26.7			2	10.5			3	8.8		
Surgical medicine	3	20.0			3	15.8			7	20.6		
Other					4	21.1			7	20.6		
Perceived family income	4	26.7			4	20.0			8	22.9		
Low	11	73.3			16	80.0			27	77.1		
Medium	0	0.0			0	0.0			0	0.0		
High												
Number of children			1.4	0.5			1.4	0.6			1.4	0.6
Age			31.5	4.3			32.2	0.3			32.2	4.3
Education (number of school years)			13.7	1.1			14.3	0.9			14.0	1.0

Measures

Social Problem Solving Inventory (SPSI-R)

The SPSI-R [45] consisted of 52 statements responded using a 5-point Likert scale ranging from 0 “Not at all true of me” to 4 “Extremely true of me”. The SPSI-R was organized into five scales that tap different facets of social problem solving process. The scales were: positive problem orientation, negative problem orientation, rational problem solving, impulsive/carelessness style and avoidance style. Scale scores range from 0 to the number of items multiplied by 4 for the SPSI-R. Higher scores indicate better problem solving skills. The Turkish SPSI-R was found to be highly reliable and valid measuring tool for the assessment of social problem solving [46].

Beck Depression Inventory (BDI)

A twenty-one item Beck Depression Inventory (BDI, 1978 version) [47] is used to assess self-rated depressive symptoms. The BDI is the most widely used self-report measure of depression. The respondent rates the frequency and the intensity of symptoms on a four-point scale ranging from 0 to 3. The Turkish BDI has documented good reliability and validity [48]. The total BDI scores range from 0 to 63. Higher scores indicate greater depression.

Rosenberg Self Esteem Scale (RSES)

The 10-item Rosenberg Self-Esteem Scale was used to measure self-esteem [49]. It is a global measure of self worth scored on a four-point Likert scale from 1 to 4. It has been adapted into Turkish by [50]. The scores range from 10 to 40, with higher scores representing higher self-esteem.

Perceived Stress Scale (PSS)

The 14-item perceived stress scale (PSS) was used to assess stress perceptions of participants [51]. It is comprised of seven positive and seven negative items. The PSS measures the degree to which situations in one's life are perceived as stressful. Participants rate items on a five-point Likert scale ranging from 0 to 4. The PSS scores are obtained by reversing the positive items and then summing the 14 items. Thus, the total PSS scores range from a low of 0 to a high of 56 with higher scores indicating greater stress perceptions. The Turkish PSS was found to hold highly adequate reliability and validity [52].

Training Evaluation Form (TEF)

Six items were designed to assess how the problem solving training provided in this study was perceived by the participants. The 6 items were as follows:

1. In this training I have learned useful ways and methods for solving my problems.
2. The things that are taught in this training met my expectations.
3. To tell the things I have learned in this training to others will be useful.
4. To participate in this training was a waste of time for me.
5. I can recommend this training to my friends.
6. I wish other things than the ones taught in this training were taught.

Participants were asked to rate the content in each item on a 5-point Likert scale ranging from "totally agree (1)" to "totally disagree (5)". Item numbers 4 and 6 are reverse coded. All TEF items are summed to obtain a total score. The total scores range from 6 to 30 with higher scores indicating more favorable reception of the training. A reliability analysis done on 15 participants in the PST condition showed that the TEF had an internal consistency coefficient of 0.73 with item-total correlations ranging from 0.19 to 0.73.

Social Problem Solving Training

A six-hour problem solving training, given by the first author, was offered to participants. The problem solving training used in this study was modelled according to the PST approach developed by D'Zurilla & Goldfried [29] and D'Zurilla & Nezu [53]. The PST was administered in a group format and lasted for 6 hours. The PST consisted of the following components:

1. *Rationale and problem orientation:* In this component participants were provided with the rationale of the problem solving and its importance in daily living together with information about how people approach problems in real life. Specifically, information about prositive and negative problem orientation tendencies were described with examples.
2. *Definition of problems:* Participants were given information about the importance of defining personal problems. Advantages of problem definition in real life were discussed. Then, strategies for defining problems were presented first and then attempts were made to exemplify them with real life issues.
3. *Goal setting:* The importance of setting goals for problem solving was discussed first and then information about goals to be set in problem solving was presented. Specifically, the participants were provided with information that the goals should be realistic, goal directed, and they should be either making a change in the problem situation or minimizing its effects on the person concerned.
4. *Generating alternative solutions:* In this component, participants were taught how to generate alternative solutions to problems defined. Nurses were presented with techniques such as brain-storming and advice to a friend who experiences the same problem. They were also advised to be as much original as possible, not to think all or none, to generate as more alternatives as possible, and not to be judgemental.
5. *Decision making:* In this component, the participants are thaught to choose the best solution to the problem. The best solution should be applicable by the person concerned and it should reach the goal set by the person. Techniques like cost-benefit analysis and using simple ratings are described here.
6. *Solution implementation and verification:* The last component or step of the problem solving training included a description of the importance of solution implementation and verification. Here the participants are taught how to implement a specific solution and how to verify it.

Procedure

After an announcement from the nursing department at the Adnan Menderes University Research Hospital the nurses indicated their interest in participating in the study. Initially, 40 nurses did so. After randomization of participants to the conditions 5 nurses from the problem solving training condition dropped due to shift problems. All participants were asked to sign an informed consent form at the initial phase of the study. Informed consent included information about the procedures to be followed in the study. All participants were asked to fill in the measuring instruments before the commencement of the study. They were also asked to fill in the same instruments 15 days after the completion of the problem solving training. They were instructed to put the measures into an envelope provided by the investigators and seal it. In order to guarantee anonymity and to match the pre-tarining/pre-waiting with post-training/post-waiting measures, the participants wrote a nickname on the questionnaires. Due to ethical reasons, the participants in the waiting list control condition were also offered the same problem solving training but did not fill in the measures at post-training. Participants within the PST condition filled in BDI, PSS and SPSI-R after six months for follow-up.

Statistical Analyses

The data were analyzed by using the SPSS-9.0 for Windows. Repeated measures Analysis of Variance (ANOVA) procedure was used to analyze the results, with condition as the grouping factor, and time being the 'within groups' factor. A total of 8 conditions (PST and WLC) by time (pre-/post- training/waiting) ANOVAs were performed to compare the groups on 8 main outcome measures. Since condition by time interaction effect tests the treatment efficacy, it is presented first in the results.

To further determine and quantify the efficacy of PST controlled and uncontrolled [54] effect sizes (Cohen's d) [55] were calculated where condition by time interaction effect was significant. A controlled effect size was calculated by subtracting the post-treatment mean of the treatment group from the post-waiting mean of the control group divided by the standard deviation of the control group. An uncontrolled effect size was calculated by subtracting the post-treatment mean of the treatment group from its pre-treatment mean divided by the standard deviation of the treatment group [56].

Nonparametric tests were used to compare the scores of groups involving fewer than thirty participants. In this case one can not assume normal distribution of data. The Mann–Whitney U-test which uses median rather than mean was used to compare the scores of two independent groups. Scores of two related groups were compared by means of Wilcoxon Signed Ranks Test procedure.

3. RESULTS

Perception of the PST

Mean training evaluation form score was 22.7 (SD = 2.7) with scores ranging from 18 to 27.

Pre-training/waiting and post-training/waiting means and standard deviations of outcome measures according to condition and time are presented in Table 2.

Table 2. Means and standard deviations of outcome measures by condition.

Measures	Problem Solving Training				Waiting List Control			
	Pre-training		Post- training		Pre-waiting		Post-waiting	
	M	SD	M	SD	M	SD	M	SD
Social problem solving (SPSI-R)								
Positive problem orientation (PPO)	16.9	4.0	17.3	5.3	18.6	3.1	19.1	3.4
Negative problem orientation (NPO)	27.8	9.1	21.8	8.8	23.4	9.8	22.2	10.2
Rational problem solving style (RPS)	68.1	15.5	71.1	24.6	75.1	13.5	73.8	13.9
Impulsive/careless problem solving style (ICS)	20.6	7.7	17.1	7.9	19.4	6.1	18.9	6.8
Avoidant problem solving style (AS)	13.2	5.5	12.5	6.6	12.5	3.8	12.7	3.6
Depression (BDI)	15.7	10.3	7.5	7.2	15.8	6.3	12.3	5.6
Perceived stress (PSS)	31.1	6.5	19.0	7.0	27.7	7.2	25.5	6.2
Self-esteem (RSES)	**28.2**	**5.4**	**30.5**	**6.2**	**32.4**	**4.3**	**32.0**	**4.7**

Depression (BDI)

The ANOVA gave a significant condition by time interaction effect, $F(1, 33) = 5.98$, $p < 0.05$, and a significant main effect for time, $F(1, 33) = 38.67$, $p < 0.001$. The main effect for condition was, however, not significant, $F(1, 33) = 1.10$, $p > 0.05$.

Post-training BDI scores were significantly lower than the pre-training scores within the PST condition ($Z = 2.03$, $P < 0.05$) but pre- and post-waiting BDI scores within the WLC condition were similar ($Z = 0.35$, $P > 0.05$).

The time main effect indicated that the post-training and post-waiting BDI scores (mean = 6.64) were significantly lower than the pre-training and pre-waiting BDI scores (mean = 15.74), $Z = 4.97$, $p < 0.001$.

An uncontrolled effect size from pre-training to post-training for BDI was 0.74. A controlled effect size between PST and WLC conditions was 0.90.

Perceived Stress (PSS)

The condition by time interaction effect, $F(1, 33) = 17.53$, $p < 0.001$ and the main effect for time, $F(1, 33) = 36.53$, $p < 0.001$ were significant. The main effect for condition was nonsignificant, $F(1, 33) = 0.60$, $p > 0.05$.

The post-training PSS scores of participants within the PST condition were significantly lower than the pre-training PSS scores ($Z = 2.61$, $P < 0.01$) but the pre and post-training PSS scores of participants within the WLC condition were similar ($Z = 1.45$, $P > 0.05$). The main effect for time showed that the post-training and post-waiting PSS scores (mean = 22.74), were significantly lower than the pre-training and pre-waiting PSS scores (mean = 29.18), $Z = 4.01$, $P < 0.001$.

An uncontrolled effect size from pre-training to post-training for PSS was 0.98. A controlled effect size between PST and WLC conditions was 1.79.

Self-Esteem (RSES)

The condition by time interaction effect was significant, $F(1, 33) = 4.38$, $p < 0.05$. The main effects for condition $F(1, 33) = 2.96$, $p > 0.05$ and time were not significant, $F(1, 33) = 2.19$, $p > 0.05$.

Post-training RSES scores were marginally significantly higher than the pre-training scores within the PST condition ($Z = 1.76$, $P < 0.08$) but pre and post-waiting RSES scores within the WLC condition were similar ($Z = 0.26$, $P > 0.05$).

An uncontrolled effect size from pre-training to post-training for RSES was 0.27. A controlled effect size between PST and WLC conditions was 0.40.

Social Problem Solving (SPSI-R)

Negative Problem Orientation (NPO)

The ANOVA produced a significant condition by time interaction effect, $F(1, 33) = 5.7$, $p < 0.05$. The ANOVA gave also a time main effect for time, $F(1, 33) = 12.7$, $p < 0.005$. The main effect for condition was not significant, $F(1, 33) = 0.44$, $p > 0.05$.

Post-training NPO scale scores were significantly lower than the pre-training NPO scale scores within the PST condition ($Z = 2.46$, $P < 0.05$) but pre- and post-training NPO scale scores within the control condition were similar ($Z = 1.81$, $P > 0.05$). The time main effect showed that post-training and post-waiting NPO scale scores were significantly lower (mean = 22.00) than the pre-training and pre-waiting NPO scale scores (mean = 25.26), ($Z = 3.03$, $P < 0.005$).

An uncontrolled effect size from pre-training to post-training for NPO was 0.04. A controlled effect size between PST and WLC conditions was 0.67.

Positive Problem Orientation (PPO)

The ANOVA revealed neither a significant condition by time interaction effect, $F(1, 33) = 0.01$, $p > 0.05$ nor a significant main effect for time, $F(1, 33) = 0.5$, $p > 0.05$. The main effect for condition was not also significant, $F(1, 33) = 2.04$, $p > 0.05$.

Rational Problem Solving (RPS)

The condition by time interaction effect, $F(1, 33) = 0.76$, $p > 0.05$, the main effect for time, $F(1, 33) = 0.11$, $p > 0.05$ and the main effect for condition, $F(1, 33) = 0.87$, $p > 0.05$ were all not significant.

Impulsive-Careless Problem Solving Style (ICS)

The ANOVA gave a marginally significant condition by time interaction effect, $F(1, 33) = 3.57$, $p < 0.07$, and a significant main effect for time, $F(1, 33) = 6.31$, $p < 0.05$. The main effect for condition was not significant, $F(1, 33) = 0.01$, $p > 0.05$.

Post-training ICS scores were significantly lower than the pre-training scores within the PST condition ($Z = 2.39$, $P < 0.05$) but pre- and post-waiting ICS scores within the WLC condition were similar ($Z = 0.36$, $P > 0.05$). The time main effect revealed that post-training and post-waiting ICS scale scores were significantly lower (mean = 18.9) than the baseline ICS scale scores (mean = 19.4), $Z = 1.98$, $P < 0.05$.

An uncontrolled effect size from pre-training to post-training for ICS was 0.24. A controlled effect size between PST and WLC conditions was 0.45.

Avoidant Problem Solving Style (AS)

The condition by time interaction effect, $F(1, 33) = 0.48$, $p > 0.05$, the main effect for time, $F(1, 33) = 0.21$, $p > 0.05$ and the main effect for condition, $F(1, 33) = 0.02$, $p > 0.05$ were not significant.

Follow up

Depression

Mean follow-up BDI scores were 8.80 (SD = 3.08). Follow-up BDI scores were statistically significantly lower than pre-training BDI scores, $Z = 2.40$, $p < 0.05$, but similar to post-training BDI scores, $Z = 1.11$, $p > 0.05$.

Perceived Stress

Mean follow-up PSS scores were 20.87 (SD = 6.99). Follow-up PSS scores were statistically significantly lower than pre-training PSS scores, $Z = 3.17$, $p < 0.01$, but similar to post-training PSS scores, $Z = 1.04$, $p > 0.05$.

Social Problem Solving

Mean follow-up NPO scale scores were 23.25 (SD = 6.88). Follow-up NPO scale scores were statistically significantly lower than pre-training NPO scale scores, $Z = 2.27$, $p < 0.05$, but similar to post-training NPO scale scores, $Z = 1.67$, $p > 0.05$.

Mean follow-up PPO scale scores were 18.33 (SD = 3.45). Follow-up PPO scale scores were similar to both pre-training PPO scale scores, $Z = 1.72$, $p > 0.05$ and post-training PPO scale scores, $Z = 0.31$, $p > 0.05$.

Mean follow-up RPS scale scores were 74.67 (SD = 14.97). Follow-up RPS scale scores were statistically significantly lower than pre-training RPS scale scores, $Z = 2.61$, $p < 0.01$, but similar to post-training RPS scale scores, $Z = 0.17$, $p > 0.05$.

Mean follow-up ICS scale scores were 19.17 (SD = 6.78). Follow-up ICS scale scores were similar to both pre-training ICS scale scores, $Z = 1.60$, $p > 0.05$ and post-training ICS scale scores, $Z = 1.82$, $p > 0.05$.

Mean follow-up AS scale scores were 12.58 (SD = 4.50). Follow-up AS scale scores were similar to both pre-training AS scale scores, $Z = 0.89$, $p > 0.05$ and post-training AS scale scores, $Z = 0.09$, $p > 0.05$.

4. DISCUSSION

Health care professions in general and nursing in particular are stressful, and hence level of psychological distress is high in nurses. Therefore there is a need for scientific knowledge base about the effective intervention strategies for reducing and eliminating psychological distress in for persons employed in these professions. This randomized controlled trial tested the efficacy of a problem solving training (PST) in reducing psychological distress in nurses employed at an academic hospital. The results showed that the problem solving training offered in the study was received positively by the participant nurses.

Depression is a common form of psychological distress and causes considerable impairment in physical, psychological, social, academic and vocational functioning. Deficient problem solving has usually been shown to be a characteristic of persons with depression [7, 8, 9]. A logical corrolary of this is that if people with depression are taught effective problem solving skills then level of depression should diminish. The findings obtained in this controlled trial provide support for this contention. Post-training depression scores of participants who received PST were found to be statistically significantly lower than their pre-training depression scores while pre- and post-training depression scores of participants within the WLC condition were unchanged. This is in line with findings from previous studies [38, 57] involving college students with suicidal ideation and older adults with depression.

Stress is involved in the development and maintenance of both psysical and mental health problems [58, 59]. As was pointed out before, nursing is one of the most stressful professions and levels of psychological distress are high among members of nursing profession. A logical inference from these assertions is that if stress and deficiencies in problem solving are causally related to the experience of psychological distress then teaching people problem solving skills should attenuate the experience of stress. In other words, one mechanism of the effect of problem solving training in reducing distress may be via its role in lowering perception of stress. The results from this randomized trial provided emprical support for this anticipation. The post-training perceived stress scores of participants within the PST condition were significantly lower than the baseline scores, but the post and pre-training perceived stress scores within the WLC condition were unchanged.

Self-esteem is a central concept in resiliency. People with high self-esteem are more resilient than those with low self-esteem [60, 61]. The other mechanism of the effect of problem solving training in reducing distress may be via its role in increasing sense of self-efficacy. The results from this trial confirmed this expectation. The self-esteem scores of participants who received problem solving training have increased significantly from baseline to post-training while the self-esteem scores of those in the waiting list control condition have not changed. This is in line with findings from Eskin, Ertekin & Demir [31]. In a group of adolescents and young adults with a diagnosis of major depression Eskin, Ertekin and Demir demonstrated that problem solving therapy not only diminished depression and suicide proneness but has also increased self-esteem and assertiveness.

The mechanism of change in psychotherapy and/or psychosocial interventions is an important endeveour [62]. Cognitive-behavioral problem solving interventions offer a unique mechanism of change. That is, people's problem solving skills should improve after problem solving intervention. This anticipation was partially confirmed in the

present study. The findings have shown that negative problem orientation scale scores of participants who received problem solving treatment have improved significantly from baseline to post-training but the pre and post training scores of participants within the waiting list control condition were unchanged. It seems that problem solving training reduces peoples' dysfunctional cognitive-emotional set which involves viewing problems as a threat to personal well-being, doubting one's ability to solve problems successfully and becoming upset when faced with problems [63].

The findings from this study should howver be approached with caution when generalizing to other samples. First, the sample of this randomized controlled trial was small. In order to achive greater power future trials should be conducted with larger sample sizes. Second, the trial involved only nurses and women. Therefore, the findings may have limited generality for men and persons in other professions. Despite these limitations, the results from this study suggest the potential value of cognitive-behavioral problem solving interventions in reducing the levels of psychological distress and increasing the levels of resiliency factors. The depression and perceived stress levels of participants receiving problem solving training decreased and their self-esteem levels increased significantly from baseline to post-training but depression, stress and self-esteem levels of participants in the waiting control condition did not change. The improvements observed in the study were maintained after six months. Obtained effect sizes were, however, from medium to large. Largest controlled and uncontrolled effect sizes were for perceived stress and depression. Medium controlled and uncontrolled effect sizes were for negative and positive problem orientation and for impulsive careless problem solving style.

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