

Effect of Decision-Making and Problem-Solving Training on Occupational Stress of Medical Emergency Personnel

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Abstract

Objective: Medical emergency personnel can experience psychological and physical stress daily. One of the ways to deal with stress is to have problem solving and decision making skills. The purpose of this study was to determine the effect of decision-making and problem-solving training on occupational stress of medical emergency personnel in Gonabad. **Method:** In this quasi-experimental study (2017), 60 employees of Gonabad Center of Medical Emergencies randomly assigned into two groups of intervention and control. The intervention group received six sessions of problem-solving training in the form of lecture, question and answer, and group discussion planned according to D'Zurilla and Goldfried protocol, while the control group did not receive any intervention. At baseline and end of the study, both groups filled ENSS. The collected data was analyzed using SPSS 20 software, independent t-test and Chi-square test ($P < 0.05$). **Findings:** each group contained 30 samples who had no significant difference in terms of underlying features ($p > 0.05$). The mean score of occupational stress was not significantly different in two groups before intervention ($P = 0.58$), while there was a significant difference between two groups after the intervention ($P < 0.001$). However, the mean difference before and after intervention was statistically significant in both groups ($P < 0.001$). Thus, the mean score of occupational stress increased in the control group and decreased in the intervention group. **Conclusion:** According to results, decision-making and problem-solving training as a short-term psychological intervention can help reduce occupational stress of people working in medical emergency services.

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Introduction

Occupation is one of the main causes of stress in people's lives. Occupation is a social identity factor, is a source to meet living needs and forms social relations, and it is one of the most important sources of stress. There is more stress in occupations where there is human contact. Job-induced psychological pressures are one of the stresses which, if excessive, can endanger health by causing physical, psychological and behavioral harm. The existence of these pressures can reduce the quality of individual performance by threatening organizational goals. (Rahmani et al., 2010).

Medical emergency personnel can experience psychological and physical stress daily, similar to the stress which occurs in law enforcement and war soldiers. Stress is defined as an event or events in which environmental demands and internal needs, or both, go beyond one's resources or tissue systems for adaptation. Stress leads to hormonal changes (for example, disturbances in cortisol regulation) which can directly and indirectly exert pressure on body tissues and plays a role in weight gain, high blood pressure, sleep problems, muscle aches and mental health problems (depression and anxiety). (Bergen et al., 2015). Post-traumatic stress disorder (PTSD) is a work-related risk factor for medical emergency personnel and is commonly and often manifested by pain and suffering of patients and traumas. (Bergen, 2006) Medical emergency technicians are faced with stressful environments such as places full of injured people, critically ill patients, etc., who are difficult to work with. (Breux, 2009) Physical and mental stressors expose emergency technicians to hazards such as accidents, errors and other damages to people, which can be avoided. (Sofianopoulos et al., 2011) The place of service for medical emergency personnel who should be present at the site of the incident causes environmental emotions with negative stress. (Breux, 2009) Increasing work hours also increases the conflict between job and family responsibilities, which can lead to occupational stress. (Aghilinejad et al., 2009).

Problem-solving training is a logical and regular approach which is taught to help people to cope with stressful situations and other situations. (Billing & Halstead, 2005) The results of numerous studies show that people who are more capable of solving problems are less likely to develop depression and are less exposed to stress, have high social skills, and less anxiety levels than others. (Salami & Aremu, 2006).

Given that empowerment of medical emergency personnel will enable them to use their full potential to achieve mission of the firm. To do this, medical emergency organization should create opportunities for individual, professional and organizational excellence. (Mehrabian et al., 2005). Reducing stress of medical emergency technician can lead to improved individual performance and physical and mental health; on the other hand, it can lead to mental health of the technician. Because decision-making and problem-solving skills can help medical emergency technicians cope with stressful situations, this study tends to examine the effect of decision-making and problem-solving training in reducing stress of medical emergency personnel.

Materials and Methods

This was a quasi-experimental study with pre-test and post-test design in which 60 qualified employees of Gonabad Medical Center of Emergencies participated.

Based on a similar study, (Heidari et al., 2013) sample size was estimated at 27 for each group using the mean comparison formula in two independent populations considering 90% test power and 95% confidence coefficient; with a probability of 10% drop, the estimated sample size was 30 in each group and 60 in both groups. Inclusion criteria were: 1) operational technician working at emergency centers 115 (rescuer, basic and intermediate technicians); 2) full consent to participate in the study; 3) at least one year of work experience; 4) 20 to 50 year old age.

After final approval of the project, the author first obtained permission from the Ethics Committee of the Gonabad University of Medical Sciences (GMU.REC.1396.9) and a written submission from the University Vice-Chancellor for Research and presented it to the head of the Gonabad Medical Accident and Emergency Management Center. The qualified samples were selected and enrolled in the study after obtaining consent from them and explaining the procedure. There were also explanations about confidentiality of information and timing of delivery of the questionnaires. Instruments and materials used to collect data included: 1) demographic information form; 2) expanded nursing stress scale (ENSS).

Before the intervention, both groups filled the questionnaire. Then, six sessions of problem-solving training, each session for 60 min, was delivered in the form of lecture, question and answer, and group discussion planned according to D'Zurilla and Goldfried protocol. In these sessions, explanations were provided regarding occupational stress. Instructions were given to enhance

problem-solving and decision-making skills. At the end of the training course, both groups filled ENSS.

Results

Table 1: comparison of mean of age (year) of subjects in two groups

group	N	Mean±SD	Independent t-test
Control	30	30.96±7.25	t=0.322 df=58 P=0.748
Intervention	30	31.50±5.44	

According to above table and based on independent t-test, there was no significant difference in the mean age of subjects between two groups and the two groups were homogeneous (P=0.748).

Table 2: Comparison of marital status, number of children, place of residence, educational level, employment status, work record, income level, work shift of subjects in two groups

Marital status	Control N (%)	Intervention N (%)	Chi-square result
Single	8 (26.3)	4 (13.3)	$\chi^2=1.667$ df=1 p=0.333
Married	22 (73.7)	26 (86.7)	
Total	30 (100)	30 (100)	
Number of children	Control N (%)	Intervention N (%)	Chi-square result
None	13 (43.3)	11 (36.6)	$\chi^2=4.894$ df=4 p=0.893
1	9 (30.0)	13 (43.3)	
2	5 (16.6)	5 (16.6)	
3	3 (3.33)	0 (0)	
4	0 (0)	1 (3.33)	
Total	30 (100)	30 (100)	
Place of residence	Control N (%)	Intervention N (%)	Chi-square result
City	20 (66.66)	24 (80.0)	$\chi^2=2.58$ df=2 p=0.119
Village	10 (33.33)	6 (20.0)	
Total	30 (100)	30 (100)	
Education	Control N (%)	Intervention N (%)	Chi-square result
High-school diploma	1 (3.33)	5 (16.66)	$\chi^2=5.952$ df=3 p=0.696
Associate's degree	20 (66.66)	13 (43.33)	
Bachelor's degree	8 (26.66)	12 (40.0)	
Master's degree	1 (3.33)	0 (00.00)	
Total	30 (100)	30 (100)	
Employment status	Control N (%)	Intervention N (%)	Chi-square result
Official	5 (16.66)	7 (23.33)	$\chi^2=1.667$ df=3 p=0.219
Corporate	22 (73.33)	22 (73.33)	
Contractor	2 (6.66)	1 (3.33)	
Trainee	1 (3.33)	0 (00.0)	
Total	30 (100)	30 (100)	
Work record	Control N (%)	Intervention N (%)	Chi-square result
<1 year	2 (6.66)	1 (3.33)	$\chi^2=3.50$ df=5 p=0.268
1-5 years	10 (33.33)	5 (16.66)	
6-10 years	14 (46.66)	18 (60.0)	
11-15 years	1 (3.33)	3 (10.0)	
16-20 years	2 (6.66)	2 (6.66)	

>20 years	1 (3.33)	1 (3.33)	
Total	30 (100)	30 (100)	
Income level	Control N (%)	Intervention N (%)	Chi-square result
500000-1 million	2 (6.66)	1 (3.33)	$\chi^2=0.853$ df=3 p=0.734
1-1.5 million	12 (40.0)	11 (36.66)	
1.5-2 million	12 (40.0)	15 (50.0)	
>2 million	4 (13.33)	3 (10.0)	
Total	30 (100)	30 (100)	
Shift	Control N (%)	Intervention N (%)	Chi-square result
Morning	1 (3.33)	0 (00.0)	$\chi^2=3.46$ df=4 p=0.279
Afternoon	1 (3.33)	0 (00.0)	
Evening	1 (3.33)	0 (00.0)	
Floating	23 (76.66)	27 (90.0)	
Constant	4 (13.33)	3 (10.0)	
Total	30 (100)	30 (100)	

According to above table and based on Chi-square test, there was no significant difference between the two groups regarding marital status of subjects ($P=0.333$) and the two groups were homogeneous. There was no significant difference in mean number of children between two groups ($P=0.893$). There was no significant difference between two groups in terms of place of residence ($P=0.99$) and the two groups were homogeneous. There was no significant difference in educational level of subjects between the two groups ($P=0.696$). There was no significant difference between the two groups regarding employment status ($P=0.199$) and the two groups were homogeneous. There was no significant difference between the two groups in terms of work record ($P=0.268$) and the two groups were homogeneous. Moreover, there was no significant difference in income level between the two groups ($P=0.734$). There was no significant difference in job shifts of subjects ($P=0.279$).

Analysis of Hypothesis

Table 3: comparison of mean score of stress (9 subscales) before and after the intervention

Sub-scales of occupational stress	Before intervention			After intervention			Difference		
	Control mean \pm SD	Intervention mean \pm SD	t-test	Control mean \pm SD	Intervention mean \pm SD	t-test	Control mean \pm SD	Intervention mean \pm SD	t-test
Death and dying	15.83 \pm 4.56	14.56 \pm 4.72	t=-1.05 p=0.295	16.43 \pm 3.88	10.20 \pm 3.10	t=-6.87 p<0.001	0.6 \pm 2.20	-4.36 \pm 3.20	t=-6.999 p<0.001
Conflict with physicians	11.80 \pm 4.31	11.70 \pm 3.48	t=-0.099 P=0.922	12.60 \pm 3.29	8.46 \pm 2.62	t=-5.37 P<0.001	0.8 \pm 1.90	-3.23 \pm 2.40	t=-7.21 p<0.001
Inadequate preparation	6.00 \pm 2.69	6.70 \pm 2.73	t=1 P=0.321	6.66 \pm 1.98	4.76 \pm 1.47	t=-4.20 P<0.001	0.66 \pm 1.66	-1.93 \pm 1.79	t=-5.80 P<0.001
Problems with peers	10.93 \pm 4.60	11.60 \pm 4.45	t=0.57 P=0.571	12.30 \pm 4.18	8.73 \pm 2.86	t=-3.85 P<0.001	1.36 \pm 2.10	-2.86 \pm 2.82	t=-6.57 P<0.001
Problems with supervisors	16.93 \pm 6.16	15.43 \pm 5.35	t=-1.00 P=0.318	17.56 \pm 4.88	10.06 \pm 3.00	t=-7.16 P<0.001	0.63 \pm 2.60	-5.36 \pm 3.69	t=-7.26 P<0.001
Workload	19.76 \pm 6.27	19.200 \pm 5.84	t=-0.362 P=0.719	21.46 \pm 5.82	13.46 \pm 3.55	t=-6.42 P<0.001	1.70 \pm 2.32	-5.73 \pm 4.56	t=-7.95 P<0.001
Uncertainty concerning treatment	21.96 \pm 6.27	20.63 \pm 5.48	t=-0.87 P=0.385	23.30 \pm 5.25	14.06 \pm 2.46	t=-8.71 P<0.001	1.33 \pm 2.72	-6.56 \pm 4.37	t=-8.39 P<0.001
Patients and their families	17.56 \pm 5.72	15.56 \pm 5.19	t=-1.41 p=0.162	18.73 \pm 5.23	11.73 \pm 3.13	t=-6.28 P<0.001	1.16 \pm 1.85	-3.83 \pm 3.38	t=-7.09 P<0.001
Discrimination	5.50 \pm 3.90	6.26 \pm 3.62	t=0.788 p=0.434	5.83 \pm 3.23	4.00 \pm 2.94	t=-2.29 P=0.25	0.33 \pm 2.73	-2.26 \pm 2.34	t=-3.95 P<0.001
Total score of stress	126.30 \pm 34.69	121.66 \pm 29.67	t=-0.556 p=0.58	134.90 \pm 29.30	85.50 \pm 15.01	t=-8.21 p<0.001	8.60 \pm 3.57	-36.16 \pm 9.74	t=-10.80 P<0.001

According to above table, there was no significant difference in mean score of death and dying ($p=0.295$), conflict with physicians ($p=0.922$), inadequate preparation ($p=0.321$), problems with peers ($p=0.571$), problems with supervisors ($p=0.318$), workload ($p=0.719$), uncertainty concerning treatment ($p=0.385$), patients and their families ($p=0.162$), discrimination ($p=0.434$) and total score of stress ($p=0.58$) before the intervention between two groups, while there was a significant difference in subscales of stress, except for discrimination ($p=0.25$), as well as total score of stress ($p<0.001$). Thus, there was a significant difference in mean difference before and after intervention between two groups ($P<0.001$). The mean score of

all subscales and total score of stress increased in the control group and decreased in the intervention group.

Discussion

Regarding the effect of decision-making and problem-solving skill training on occupational stress and comparing it in intervention and control groups, the results indicated the effectiveness of problem-solving skill training in reducing occupational stress of medical emergency personnel. In other words, there was a significant difference in scores of problem-solving skill training group and the control group which did not receive any training.

In explaining the effectiveness of problem-solving training on occupational stress of medical emergency personnel, it can be claimed that confronting various stresses and problems in life is an integral part of each person; this is also more evident in medical emergency personnel. Based on the Hans-Selye theory (General Adaptation Syndrome), people who encounter problems enter the resistance phase after experiencing the risk alarm phase. At this phase, the body's mechanisms are mobilized to cope with the stressor by spending energy. The faster a person can handle the problem, the less energy is spent, and the chance of reaching the third phase (burnout and fatigue) is reduced, resulting in more psychological and physical health. Under these conditions, it is clear that people with high problem solving power can easily and quickly resolve problems, and as a result, the amount of negative and destructive effects of unsolved problems is diminished on various social, psychosocial and biological dimensions.

Regarding occupational stress of medical emergency technicians, comparison of subscales (death and dying, conflict with physicians, inadequate preparation, problems with peers, problems with supervisors, workload, uncertainty concerning treatment, patients and their families and discrimination) in two groups showed that the mean score of all sub-scales increased in the control group and decreased in the intervention group. In different studies, the effects of problem solving skill training have been proven on occupational stress and stress-inducing situations.

Moattari showed that interventional programs with group work for students reduced stress and increased self-esteem in them.(Moattari et al., 2005). In a similar study, Soltani et al showed that problem-solving skill training increased self-concept in nursing students.(Soltani et al., 2003) Shahbazi et al. also showed that problem-solving training programs can increase stress tolerance in nursing students.(Shahbazi et al., 2012) Shewchuk et al showed that problem solving skills depend on cognitive-behavioral abilities; the more correct and mature emotional reactions to problems are, problem solving power will be greater because of better understanding of the problem and better interpretation of the situation, and the stronger problem solving will lead to less effect of stress.(Shewchuk et al., 2000) Ghavipankeh et al argued that problem-solving training as a short-term psychological intervention could promote mental health of students and provide the opportunity to achieve caring skills and enhance the quality of nursing and midwifery care.(Ghavipankeh et al., 2014)

Although the position of subjects and cases examined in above studies is different, all of the above are consistent with the present study.

Considering the need for problem-solving skills in the medical and paramedical profession, these studies are also recommended in other medical fields. On the other hand, it seems necessary to consider problem-solving training courses for medical emergency students in order to educate technicians who, in complex medical and care settings, are able to solve a problem and decide appropriately and have the ability to communicate correctly and

understand feelings and value system of themselves and patients for making decisions and judging correctly in various emergency situations and promote professional development and increase patient satisfaction and improve their level of health by using these skills.

Using the results of this study is recommended by providing guidance to planners, designers, instructors and users of medical emergency programs, pre-hospital emergency managers and medical emergency technicians in order to strengthen problem solving and decision-making skills.

Conclusion

According to results of this study, as well as high exposure of medical emergency personnel to stressful environments and conditions which reduce quality of pre-hospital care and considering that problem solving training is a way of coping with stress and reducing occupational stress, it can be concluded that strengthening the problem-solving skills and increasing the decision-making power of medical emergency personnel can promote personnel and improve the quality of pre-hospital services. Therefore, it is suggested to include a problem-solving training program in in-service training programs, examine the effect of long-term problem-solving training on reducing occupational stress of medical emergency personnel and improving the quality of pre-hospital emergency services.

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