ORIGINAL ARTICLE

Effect of Roy's Adaptation Model-Guided Education on Coping Strategies of the Veterans with Lower Extremities Amputation: A Double-Blind Randomized Controlled Clinical Trial

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Abstract

Background: Any defect in the extremities of the body can affect different life aspects. The purpose of this study was to investigate the effect of Roy's adaptation model-guided education on coping strategies of the veterans with lower extremities amputation.

Methods: In a double-blind randomized controlled clinical trial, 60 veterans with lower extremities amputation referring to Kowsar Orthotics and Prosthetics Center of Veterans Clinic in Tehran, Iran were recruited using convenience method and randomly assigned to intervention and control groups in 2013-2014. Lazarus and Folkman coping strategies questionnaire was used to collect the data. After completing the questionnaires in both groups, maladaptive behaviours were determined in the intervention group and an education program based on Roy's adaptation model was implemented. After 2 months, both groups completed the questionnaires again. Data were analyzed using SPSS software.

Results: Independent T-test showed that the score of the dimensions of coping strategies did not have a statistically significant difference between the intervention and control groups in the pre-intervention stage ($P>0.05$). This test showed a statistically significant difference between the two groups in the post-intervention stage in terms of the scores of different dimensions of coping strategies ($P>0.05$), except in dimensions of social support seeking and positive appraisal ($P>0.05$).

Conclusion: The findings of this research indicated that the Roy's adaptation model-guided education improved the majority of coping strategies in veterans with lower extremities amputation. It is recommended that further interventions based on Roy's adaptation model should be performed to improve the coping of the veterans with lower extremities amputation.

Trial Registration Number: IRCT2014081118763N1

Keywords: Adaptation; Amputation; Coping strategy; Roy's model; Veterans

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Introduction

One of the harmful effects of war is physical and mental problems occurring in those who are directly or indirectly active in the war.[1] Today, stress is a major problem. Context-inappropriate physiological and emotional responses are hallmarks of stress-related disorders (depression, post-traumatic stress disorder).[2] Amputation is one of the most common movement disability[1] and a life-changing event that signifies long-term physical, social, psychological, and environmental changes.[3] In a study in England, the major amputation rate was reported 5.1 per 100 000 population.[4] In developed countries, peripheral vascular disease is the major cause, whereas trauma, infections, uncontrolled diabetes mellitus and malignancies are the leading causes for amputation in developing countries.[5] During the Iran-Iraq war in years 1980-1988, about 20801 people in Iran underwent upper or lower limb amputation. Of these, approximately 12981 patients had lower limb amputation at different parts of their limbs.[6] Any defect in the body parts leads to a sharp decline in physical activity and individual's mobility and interferes with the natural role of the individual, causing limitations, and physical, mental and social problems. All of these issues lead to problems in the individual's life.[1] Some of the veterans in addition to severe stress about the presence in the battlefield had stress-induced problems and disabilities in war such as amputation at the end of war, which in turn creates difficulties in their compatibility.[7] Studies have shown that there is a wide range of acute and chronic injuries and other problems in veterans, war survivors and their family members.[1,8] Researchers showed that stress does not endanger the health of behaviour, but it is the appraisal method of stress and ways of coping with it.[9] One of the essential components of mental health is coping skills that are different among people.[7] If the person's coping efforts are effective and adaptive, stress creates less tension. On the contrary, if the coping pattern is maladaptive and inefficient not only it does not inhibit stress, but it is considered as the source of tension and aggravates the condition.[9] It is important for the patients to return to their normal life after amputation. If coordination and compliance increase, their life will be more favourable. In this regard, rehabilitating the war-affected people and increasing their independency are an important goal. Many people with amputations do not know how to cope with this situation and how to care for the amputated limb; thus, psychological training is necessary to increase the individual's adaptation strategies in patients with amputations. Evidence showed that model based education plans could improve the patients' adaptation.[10] Lazarus and Folkman defined the coping strategies as a set of cognitive and behavioural responses whose goals have been identified to minimize the tension of the stressful situation.[11] Coping strategies are considered the intermediate process between stressors and health outcome. In fact, coping is considered to be of critical importance in determining whether a stressful event results in adaptive or maladaptive outcomes.[12] Coping strategies are different due to life changes and tensions of these variations among different individuals and based on different situations.[13,14] Selecting appropriate coping strategies can reduce the effects of stress on mental health. Thus, it can lead to a greater adaptability.[14] A large number of injuries including amputation occur, leading to hospitalization, receiving medical and pre-hospital services, and utilizing equipment and human resources for treatment and rehabilitation of the injured people.[15] Nurses can play an important role in rehabilitation, creating adjustment with the new situation, and reducing patient's stress. Roy Adaptation Model (RAM) is one of the practical and effective models in nursing which addresses the adaption problem in physical and psychological dimensions on chronic diseases, widely.[16-18] According to this model, a nurse assesses the patient in an accurate and systematic method through interviews, observation and measurement. Then, the maladaptive behaviour in physiological, self-concept, role function, and independent modes along with behaviour stimuli

are determined and, subsequently, it designs the exact and accurate education plan to address the maladaptive behaviour.[19] Roy considered adaption as an effect consisting of three focal, contextual and residual stimuli. She considers achieving the optimal adaptation as achieving patient to compatibility in four modes.[20,21] Studies based on RAM showed that nursing care in patients with chronic conditions and the patients' adaptive responses improve.[10,19,22] Studies have recommended regular and periodic examinations for treatment, rehabilitation and education programs for lower limb amputees to increase their independency and improve the quality of their life.[6,23] Studies showed that using nursing models and theories, such as the RAM, can be effective as an organized framework to investigate the effectiveness of nursing interventions and caring programs. On the other hand, according to the remarkable number of amputees in Iran, their long-term complications and deep effect of this disruption in their lives and few studies about adaptation of these patients, we decide to design and implement a care plan based on RAM to evaluate its effect on adaptive strategies among lower limb amputees. So, we can reach a new knowledge and insight to solve the problems and difficulties of these patients; also, health care providers can use the results of this research in order to improve the adaptive coping strategies. The aim of this study was to investigate the effect of RAM-guided education on coping strategies of the veterans with lower extremities amputation.

Patients and Methods

Design

This study is a double-blind randomized controlled clinical trial which was conducted in January 2013 to June 2014.

Setting and Samples

Veterans with lower extremities amputation referring to Kowsar Orthotics and Prosthetics Center of Veterans Clinic (KOPCVC) in Tehran, Iran were recruited using convenience method. This clinic is a referral center for patients from all over the country. Considering the mean differences and standard deviation (2, 2.21) in previous study,[24] alpha (0.05) and power level (90%), and using sampling formula,

$$N = \frac{2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(\frac{\mu_1 - \mu_2}{\delta})^2} = \frac{2(1.96+1.28)^2}{(\frac{2}{2.21})^2} = 26$$

the number of subjects in each group was estimated to be 26 persons and considering the drop-out rate of 20%, 62 subjects were included in the study. Then, we successfully recruited and randomly assigned the subjects into the intervention and control groups using t a simple random-numbers table. For equal allocation to the two groups, the direction to read the table was predetermined to the right. Then, arbitrary point was selected. For equal allocation, the investigator equated the odd and even numbers to intervention and control groups, respectively. The subjects were not notified of the group assignment until the data were collected. Also, the analyzer was blind to the randomization of data until the end of the study. Inclusion criteria were the ability to read and write in Persian, age below 65 years old, lack of mental disease, the absence of spinal cord injury and not being a chemical veteran. The exclusion criteria included unwillingness to continue the participation in the study. After obtaining informed consent from the subjects, the purpose and the stages of the study were explained to them. The researcher made an attempt to coordinate the date of completion of the questionnaire in the post-intervention phases with the patients' next referral for evaluating their prosthesis for those who had transportation problem. The researcher also entertained them briefly while behaving politely to them and awarded a small gift (notebook and felt-tip pen) to them. The subjects' lunch was prepared when the educational class was organized and served in a quiet and suitable place. In this way, the researchers tried to encourage the participation and cooperation

of the veterans.

Data Collection and Tools

The tools of data collections were a demographic questionnaire, RAM questionnaire and ways of coping questionnaire prepared by Lazarus and Folkman. A demographic characteristics questionnaire consisting of 16 questions was used to collect the subject's demographic data.

The RAM research-made questionnaire containing 35 questions in four modes of physiologic (15 questions), self-concept (11 questions), role function (5 questions), and interdependence (4 questions) was used which examined the adaptation level of the subjects. Some of the questions included in the RAM questionnaire were as follows: in the physiologic mode: "How much did you exercise during the last month?"; in the self-concept mode: "How much did you care about your appearance?"; in the role function mode: "How much harmony exists between the expectations that you have of yourself with what others expect of you?" and in the interdependence mode: "How much did you feel closer to your friends and families?".

The answer to each item is organized based on five point Likert scale from 1 (never) to 5 (always). Questions had negative and positive aspects. The total range of the questionnaire was between 35 and 175 points. The upper scores showed better adaptation. Validity and reliability of RAM questionnaire have been confirmed. For this purpose, fourteen faculty members of nursing in AJA, Baqiatallah, Tehran, Tarbiat Modares and Shahid Beheshti University of Medical Sciences, who had experience of work in military setting or caring from veterans evaluated the questionnaire and after making necessary changes, the instrument's content validity was confirmed. To confirm the face validity, comments of 20 veterans, outside the research environment were used and their ideas were applied. Content validity ratio (CVR) and content validity index (CVI) of the instrument were examined and total content validity index of the instrument was calculated 0.95; also, CVI and CVR for each of items of questionnaire were 0.79 and 0.51, respectively. Cronbach-alpha for the 35 item RAM questionnaire was 0.91.[25]

Another tool was Persian version on ways of coping questionnaire of Lazarus and Folkman that has been derived from Lazarus and Folkman's theories about emotion, stress and adaptation and measures the thoughts and actions of people to cope with the stress of everyday life. This questionnaire has 66 items. The answer to each item is organized based on four point Likert scale from 0 (not applicable/not used at all) to 3 (used a great deal). This questionnaire describes eight subscales (Confrontive coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, Planed Problem Solving, and Positive Reappraisal).[14] It is a standard tool and its validity and reliability have been confirmed in different studies.[26-28] In a study, it has been reported that the eight subscales jointly account for 61% of the total variance. Cronbach-alpha for the total score was 0.88.[26]

The subjects completed the questionnaires before and two months after the intervention. After completing the questionnaires in the first stage, the data of the intervention group were analyzed and investigated. After determining maladaptive behaviours in the intervention group, the education plan was designed and it was implemented based on RAM. Educational content was determined based on subject's response in the intervention group to RAM questionnaire and identifying maladaptive behaviours and the stimuli of these behaviours. Educational intervention was designed in two individual and group methods. Thus, group educational methods were used to modify the common stimuli of maladaptive behaviours among the subjects and face-to-face individual education was used to modify the stimuli of the individual maladaptive behaviours for each one of the subjects. Individual training consisted of two sessions, each lasting 30 minutes using

question and answer method. Group training consisted of two sessions, each lasting 2 hours using lecture method, during 2 weeks and 30 minutes questions and answers at the end of each session. For group training, educational aid tools such as computers and projectors to display the prepared slides in PowerPoint software were used. Also, an educational manual was given to the subjects. This manual contained information about the problems of the veterans with lower limb amputees and related behaviours which were designed in the questionnaire. The subjects were followed during 2 mouths to follow-up the recommendations and modifying problems by telephone. The phone number of the researcher was given to the subjects for responding to possible questions. After 2 months, both intervention and control groups completed the questionnaires, again. The control group was trained according to the routine training protocol by the staff of KOPCVC and educational manual was given to them after completion of the questionnaire in second stage. During the study, one subject from the intervention group and one from the control group were excluded (3.22% of drop-out) due to withdrawal from participating in the study and travelling to another city and finally, 60 persons were studied. Stages of the research are shown in Figure 1.

Data Analysis

Finally, data were analyzed using SPSS software version 19. Since the results of Kolmogrov-Smirnov test showed the normality of the data ($P<0.05$), descriptive statistics (mean, standard deviation, frequency and percentage) and analytical statistics (independent t-test, paired t-test, Chi-square test and Fisher's exact test) were used for data analysis. In addition, the significance level was considered $P<0.05$.

Ethical Considerations

This study was approved by Ethics

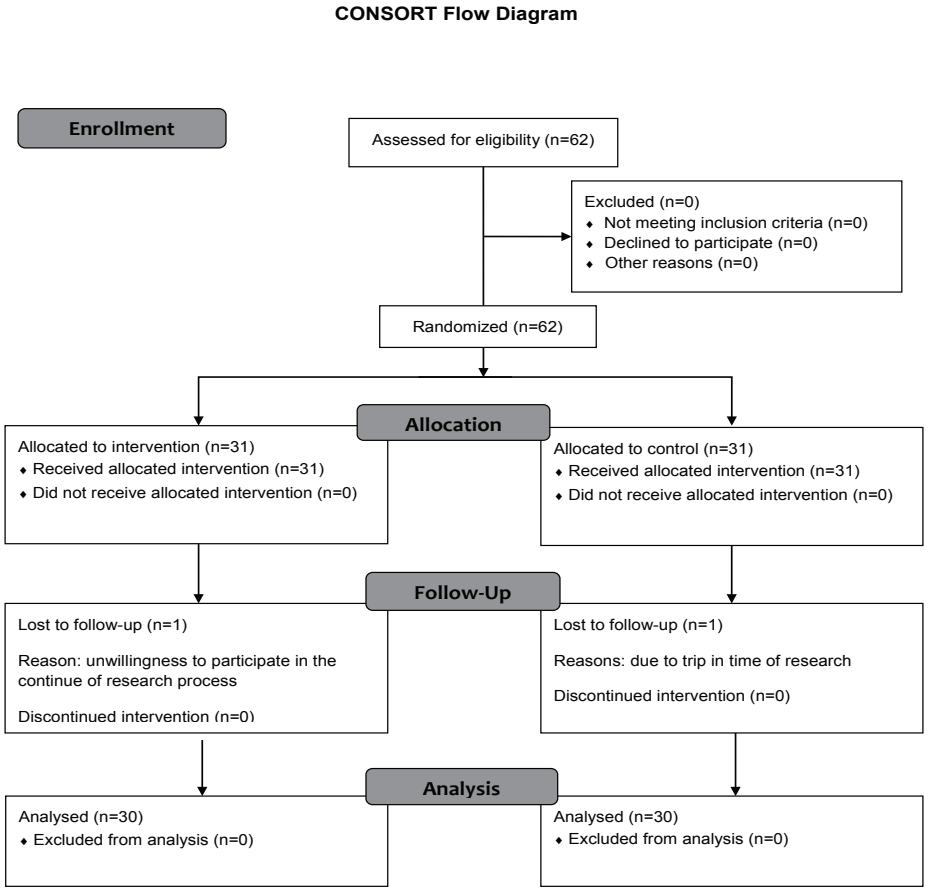

Figure 1. Flow diagram of the participants

Committee of AJA University of Medical Sciences (NO. 9203). Also, outlined ethical principles in Declaration of Helsinki were observed. The observed ethical considerations included obtaining the informed consent, subjects' justification about the study and its objectives, respect to privacy principle and confidentiality of information, subjects' freedom to leave the study at any time of study, respect to the rights of authors in the use of electronic and printed references.

Results

The mean age of the subjects was 29.8±83.47 (range 17-64 years). It should be noted that the youngest subjects was a 17-year old young person from one of the Iran's border cities that during childhood, while he was playing, due to the mine explosion that was remained from the war time, he had undergone a lower limb amputation. 98.3% of the subjects were men, 51.7% had an education in Diploma level or lower, 61.7% were with a lower limb amputation below the knee and 83.3% were covered by Foundation of Martyrs and Veterans Affairs (FMVA). All the subjects used prosthesis. Independent t-test, Chi-squared test and Fisher's exact test showed that the two groups did not have a significant difference in terms of demographic characteristics (age, sex, weight, educational level, occupation, marital status before and after amputation, number of children, living with people at present, captivity history, amputation level, type of veteran, percentage of veteran, time of using prosthetics, physical illness under treatment, daily physical activity and support by FMVA) ($P>0.05$).

Independent t-test showed that in the pre-intervention stage, there was no significant difference between the intervention and control groups in the mean score of coping strategies ($P>0.05$), while this test in the post-intervention stage between the two intervention and control groups in all dimensions of coping strategies showed a significant difference ($P<0.05$), except in two dimensions of seeking social support and positive reappraisal (Table 1).

The results of paired t-test showed that the mean scores of the confrontive coping, distancing, self-controlling, accepting responsibility, escape-avoidance, planed problem solving dimensions in the intervention group in the pre-intervention and post-intervention were significantly different ($P<0.05$), whereas the scores of seeking social support and positive reappraisal in the two stages did not have a significant different ($P>0.05$). This test did not show a statistically significant difference in confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planed problem solving, and positive reappraisal dimensions in control group in the stages of pre-intervention and post-intervention ($P>0.05$) (Table 1).

Discussion

The present study was conducted to determine the effect of RAM-guided education on coping strategies of the veterans with lower extremities amputation. The results showed that there was no significant difference between the intervention and control groups before the intervention in coping strategies ($P>0.05$) and the two groups were homogenous before the intervention. While after the intervention, the two groups had a significant difference in the mean scores of coping strategies ($P<0.05$), except in two dimensions of social support seeking and positive reappraisal ($P>0.05$). Similar results have been reported in other studies. For example, in a study it was revealed that behaviour cognitive therapy was effective on the use of coping strategies and reduction of the pain in women with chronic low back pain.[29] In another study, researchers showed that training the method of problem solving can change the students' coping strategies. The results of the mentioned research showed a significant difference in dimensions of planed problem solving and seeking social support between the intervention and control groups.[30] It should be noted that the questionnaire used in

Table 1: Comparison of the Mean and Standard Deviation of Coping Strategies in the Intervention and Control Groups

Coping strategies	Group	Time		P value**
		Before Mean±SD	After Mean±SD	
Confrontive coping	Intervention	13.76±3.56	15.86±3.94	0.024*
	Control	13.63±2.82	13.70±2.83	0.87
	P value***	0.87	0.01*	-
Distancing	Intervention	15.13±2.97	13.33±2.78	0.007*
	Control	15.63±2.67	15.40±3.16	0.59
	P value***	0.49	0.009*	-
Self- controlling	Intervention	17.46±3.19	19.26±3.13	0.007*
	Control	17.33±3.57	17.36±3.32	0.93
	P value***	0.87	0.02*	-
Seeking social support	Intervention	17.26±3.10	17.80±3.44	0.29
	Control	16.26±4.00	16.23±3.43	0.92
	P value***	0.28	0.08	-
Accepting responsibility	Intervention	10.63±2.59	12.26±2.67	0.01*
	Control	10.60±1.71	10.93 ±1.81	0.25
	P value***	0.95	0.02*	-
Escape – avoidance	Intervention	15.30±3.91	14.00±3.55	0.023*
	Control	15.90±4.01	15.90±3.75	1.00
	P value***	0.56	0.04*	-
Planned problem solving	Intervention	15.40±3.01	17.76±3.08	0.002*
	Control	15.96±3.07	16.06±2.85	0.77
	P value***	0.47	0.03*	-
Positive reappraisal	Intervention	20.13±2.94	21.16±3.43	0.099
	Control	20.53±3.49	19.70±3.67	0.05
	P value***	0.63	0.11	-

SD: Standard Deviation; *Significant at the P<0.05; **Paired sample t test; ***Independent samples t test

the mentioned research was different from that of the present study. Another study showed that the application of RAM to the care of patients with chronic diseases certainly contributes to the promotion of individual's adaptation and integrity.[10,22]

In the present study, the mean score of the intervention group in all dimensions had more improvement than the control group. As in the post-intervention stage, the majority of adaptive coping strategies such as the confrontive coping, planed problem solving, self-controlling, and accepting responsibility significantly increased and maladaptive coping strategies such as distancing and escape-avoidance significantly decreased. These results showed the effectiveness of RAM-guided education and improvement of the veterans' coping strategies. These results are in line with other studies. For instance, some researchers showed that RAM-based education plan improved the adaptation of physiologic and self-concept modes in haemodialysis patients.[10] Also, a significant improvement was reported in the role function of chronic obstructive pulmonary disease patients after conducting RAM-based education; it increased the patients' knowledge, they better controlled the symptoms and increased their well-being.[19] In another study, researchers evaluated the effectiveness of training problem-solving skills on coping skills of depressed nursing and midwifery students. They showed that the mean of the seeking social support, accepting responsibility, planed problem solving and positive reappraisal in post-intervention increased and the mean difference of confrontive coping, distancing, escape-avoidance and self-controlling decreased in the study group.[31] Also, other researchers

showed that cognitive behaviour therapy can reduce low back pain and maladaptive coping strategies such as distancing and escape-avoidance and increase the adaptive coping strategies such as confrontive coping, accepting responsibility, planed problem solving, positive reappraisal, seeking social support and self-controlling.[26] Another study showed that after the intervention, adaptive coping strategies such as seeking social support, accepting responsibility, planed problem solving and positive reappraisal increased and confrontive coping, distancing, escape-avoidance, self-controlling reduced;[9] this is in line with the results of the present study.

In this study, the results showed that since a number of years were passed from Iran-Iraq war, these patients were largely consistent with their new conditions. So, to create more and more sustainable changes, we will need more time, persistence and follow-up care plans for longer periods. Also, it seems that for having more significant effects in the dimension of seeking social support, involvement of family members and friends of the patient, especially her/his spouse, is so important. Because social support means all facilities that a person provides for the other one and the person will have a feeling of care, love, self-esteem and value; also, he/she is in a part of extensive communication network and can cope with stress causing factors well.[13] If the patients have family support, especially family and other's support, the amount of stress created by the illness will be somehow reduced and it will be effective in their logical coping. In the present study, care program focused only on patients and the intervention on families was not conducted; it can be a reason of the lack of significant effect on seeking social support. It seems that education of coping strategies and life skills will be useful for veterans and their families. Another subscale that did not significantly change was positive reappraisal. Positive reappraisal is justified by religious norms, cultural traits and beliefs. This subscale describes efforts to create positive meaning by focusing on personal growth. It also has a religious dimension.[26] Since the changes in culture and religion need more time, to create significant changes in the positive reappraisal subscale, we will need more intervention and follow-up care plans for longer periods.

It should be noted that in Iran veterans are supported by Military Forces and FMVA, so their job and economic problems are partly modified. However, rising and persisting of supportive mental and physical measures such as education, timely treatment, and counselling services to help them have a significant role.

Overall, the findings showed that application of RAM-guided education can develop the veterans' adaptive abilities to cope with situations. Also, the results emphasize the importance of coherent care program and continuing education courses sequentially after amputation. These programs can probably increase the sense of value and the activity level in these patients. Subsequently, the adaptive coping strategies will be increased.

There were some limitations in the current study including short period of the study, low number of follow-ups and small sample size. Also, many years are passed from the Iran-Iraq war, so the patients have somehow adapted with the situation over time. In this study, we decided to use those people who had suffered amputations while they were in the process of clearing mine fields so that during this study, such a person did not refer to the research setting.

Conclusion

Briefly, this study showed that RAM-guided education leads to improvement of coping strategies among lower limb amputees. It is suggested that further studies with larger sample size and in longer follow-up period should be conducted. Also, studies on the effect of care program based on RAM or other nursing models and theories on the quality of life and the adaptation of other veterans and their families

are recommended.

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Conflict of Interest: None declared.

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