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The effect of comprehensive individual motivational-educational program on medication adherence in elderly patients with bipolar disorders: An experimental study

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Abstract:

BACKGROUND: The number of older adults with bipolar disorder is increasing and medication non-adherence is a major problem that negatively impacts the course of bipolar disorder. This study aimed to determine the effect of a comprehensive individual motivational-educational program on medication adherence in elderly patients with bipolar disorder.

MATERIALS AND METHOD: An experimental study with pretest-posttest repeated measures with a control group was conducted on two groups of 62 elderly people with bipolar disorders hospitalized at Ibn Sina Hospital in Mashhad, Northeast Iran, 2019. For the elderly in the intervention group, a comprehensive motivational-educational program was administered for one month (four 30–45 minute sessions), and for the elderly in the control group, routine clinical care was performed. Medication adherence in both elderly groups was measured before, immediately after, one and two months after the intervention. Data were analyzed by SPSS statistical software (version 16) using descriptive statistics and independent t-test, Mann-Whitney, paired t-test, repeated measures analysis of variance (ANOVA), and Chi-square tests.

RESULTS: The mean age of elderly in the intervention and control groups were 69.03 ± 5.75 and 68.50 ± 6.73 years, respectively. Regardless of the groups to which the patients were assigned, a significant difference in medication adherence scores was observed during the study period (time effect; $P < 0.001$). Also, the medication adherence score was significantly lower in the intervention group, compared to the control group (group effect; $P < 0.001$). Also, there was a group time interaction between the medication adherence score and the time of evaluation ($P < 0.001$).

CONCLUSION: The results of the present study confirm the positive effect of a comprehensive educational-motivational program on improving medication adherence in elderly patients with bipolar disorder.

Keywords:

Aged, bipolar disorder, medication adherence, motivational interviewing, patient education

Introduction

Aging with its psychological-social and cultural-economic dimensions is considered to be a serious challenge facing the family and society, especially

in developing countries.^[1] Between 2015 and 2050, the number of elderly people will rise from 12% to 22% of the total world population. The growth rate of the elderly population of the country rose from 1.3 to 3% over the past two decades and

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according to the 2006 census, it amounted to 7.25% of the population^[2] while it was reported to be 9.27% of the population in the 2016 census.^[3] It has been previously shown that chronic diseases are the leading causes of disability and premature death among the elderly population.^[4] Bipolar disorder is thus seen as one of the most prevalent chronic and complex disorders of mood, affecting the mental status of people in old age.^[5] This disease is characterized by recurrent periods of depression and mania with or without depression.^[6,7] The likelihood of suicide in patients with this disorder is greater and about 15%.^[8,9] Various studies also indicate higher social costs bearing on the patient's caregivers and the patient him/herself (as a result of reduced abilities and productivity)^[10-12]; in the meantime, many patients were found to have low acceptance of continuous medications.^[13,14] Considering that pharmacological treatments are efficacious in both acute and long-term treatment of bipolar disorder, medication adherence is vital to the effective long-term treatment of these patients; thus enhancement of adherence is often an important clinical goal. Poor medication adherence is associated with an increase in relapses, suicide and suicide attempts, and also functional impairment.^[13-15] Adherence has been defined as "the extent to which a person's behavior, taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider".^[13] It has been previously indicated that about half of the patients diagnosed with bipolar disorder become non-adherent during long-term treatment, a rate that is largely similar to other chronic illnesses and one that has remained unchanged over the years.^[13-14] Therefore, it is significantly important to prevent the progression of the disease or reduce recurrences in these patients, which is possible by proper and timely adherence to pharmacological and non-pharmacological treatments.^[15] A study suggested that the complications and poisoning from taking prescribed drugs in the elderly increased the likelihood of behavioral and cognitive changes in them and disrupt the process of drug administration, resulting in poor adherence to the regimen.^[16] A study demonstrated that medication non-adherence in bipolar patients was 20–66%, significantly increasing the risk of disease exacerbation and readmission to the hospital.^[17] This is while one of the objectives of the World Health Organization to promote mental health and treatment of mental illness is to reduce the length of hospital stays and expand social services.^[18]

In recent years, much emphasis has been placed on intervention implementation to improve medication adherence in these patients.^[17] Included in the strategies affecting the medication adherence of bipolar patients are educational, psychological, and social interventions such as cognitive-behavioral therapies, psycho-social

therapies, individual-social therapies, individual and group psychological training, and community return programs.^[19,20] However, these programs have proved to have short-term effects and if discontinued, patients will not follow their treatment plans, as these programs provide no such motivations.^[21] The results of a study demonstrated that psychotherapy training could yield positive changes in bipolar patients type I such as increased patient insight, collaboration with regular drug use, increased effectiveness of blood variables in these patients along with heightened motivation in psychotherapy sessions.^[22] Also, the study by Fakhri *et al.*^[23] demonstrated that the effectiveness of theoretical education on medication adherence as directed in the elderly with hypertension was followed by improved medication regimen adherence in them. Other studies pointed out that a positive attitude towards mental illnesses was considered as an important factor and this anticipates successful rehabilitation and return to the society.^[24] Patients' failure to fully comply with the follow-up treatment and medication regimen is a negative outcome, which leads to increased recurrence and readmission.^[25]

To better understand the elderly's adherence behavior, researchers have examined the motivational aspects of their decisions to start and continue a medication regimen.^[26] Motivation is the process of turning to a particular activity and continuing it. This process that motivates and directs behavior, includes internal drives and external stimuli, increasingly helping people participate in the treatment program^[27,28]; on the other hand, education about the disease, symptoms, causes, its treatment, and the importance of following the medication plan can help people make better decisions.^[29,30] Therefore, the simultaneous strengthening of these aspects can greatly help the elderly, and in the present study, this was instructed to the elderly in the form of a motivational-educational program. In fact, this program is a kind of empowerment program aiming to promote informed efforts for the individuals, families and communities to take care of themselves in order to take responsibility to maintain health.^[30]

As studies demonstrated, medication adherence at all ages, especially in the elderly with several chronic diseases, especially bipolar disorders, is highly important. On the other hand, considering the problem of medication adherence in the elderly, which is influenced by several factors including lack of knowledge about the disease as well as failure to respond to drug treatment alone, will increase the risk of recurrence, exacerbation of disease and readmission to the hospital. In recent years, different interventions including psychological education, individually or collectively, have aimed at promoting drug adherence in patients with chronic

diseases, including those with bipolar disorder. On the other hand, considering that no motivational-educational intervention has been implemented in Iran on drug adherence in elderly people with bipolar disorder, and that only some studies have delved into the individual education of other aspects of nursing care such as quality of life of mentally ill patients, this study was aimed to determine the effect of a comprehensive individual motivational-educational program on drug adherence in the elderly with bipolar disorder.

Material and Methods

Study design and setting

An experimental study with pretest-posttest repeated measures with a control group was conducted in 2019. The study population included all elderly people with bipolar disorder hospitalized at Ibn Sina Hospital in Mashhad, Northeast Iran.

Study participants and sampling

The research sample consisted of 62 patients who met the inclusion criteria and entered the study with informed written consent. Then they were randomly assigned to intervention and control groups using the permuted block method (to prevent unbalanced distribution in the randomization process).

Inclusion criteria were willingness to participate in the study, age of 60 and older, confirmation of a bipolar disorder based on DSM-IV criteria by a psychiatrist, experiencing of an acute phase of the disease (mania phase), non-adherent to medications, having a caregiver, no difficulty attending the sessions and the ability to communicate verbally or participation with a family member, i.e., father, mother, brother, sister, spouse or the child of the patient who spends the most time caring for the patient, and no cognitive impairments (mental retardation, dementia, Alzheimer); whereas, exclusion criteria included failure to attend more than one motivational-educational session, non-taking of medication, aggravated disease, and withdrawal from or unwillingness to continue participating in the study. Also, participants with a diagnosis of dementia or other neurological condition that would limit their ability to participate in the groups were excluded.

Data collection tool and technique

The study tools included the Demographic-Medical Information of the Elderly and Their Caregivers Questionnaire and the Morisky Medication Adherence Inventory. Demographic information questionnaire include age, sex, marital status, number of children, life partners, level of education, underlying disease, number of hospitalizations while caregiver information questionnaire consisted of 5 questions about age, gender,

level of education, place of residence, and caregiver relationship with the patient. Morisky Medication Adherence Inventory was published by Morisky *et al.*^[31] This inventory has two 4 and 8 question forms in this study, which the latter was used. The answer to each of these questions is yes/no, with each yes answer assigned score 1 and each no answer assigned score 0. The total scores from answering each question are classified into three categories of high medication adherence, moderate medication adherence and low medication adherence. The maximum score in this tool is 8, indicating poor adherence, and the minimum score is zero, indicating high levels of adherence. The validity of all three scales was determined by content validity method. The reliability of the medication adherence inventory in the present study was evaluated by internal consistency method via calculating Cronbach's alpha correlation coefficient. Thus, a questionnaire was completed for 20 elderly volunteers with bipolar disorder in a pilot study, the reliability of which was then evaluated using Cronbach's alpha correlation coefficient, confirmed to be $r = 0.91$.

Patients' medication adherence in both groups who met the inclusion criteria was measured. The elderly and caregiver information questionnaire was also provided to them to be completed.

The intervention group received a comprehensive individual motivational-educational program in a special room equipped with audio-visual equipment for the group therapy, by an expert research assistant. This program, which combines educational and motivational methods and whose efficiency of implementation has been confirmed in various studies, consists of five components, administered for the individual patients in the form of two educational and two motivational sessions. The five components of the program included the following:

1. Reviewing and recording medications the patient has taken as directed (through the patient and his/her primary caregiver)
2. Examining the patient's complaint about unwanted side effects of the medications which led to drug withdrawal (through the patient and his/her primary caregiver)
3. Examining and recording other reasons for drug withdrawal (such as forgetfulness, low knowledge, financial problems, etc.) (through the patient and his/her primary caregiver)
4. Educating the patient about the importance of following treatment regimens (through the primary caregiver, training booklet and providing feedback) and correcting the reasons for drug withdrawal identified in steps 1 to 3.
5. Motivating the patient and the main caregiver to use the medication and also raising the importance

of continuous medication use to prevent disease recurrence (motivational interview)

Explaining the program components: In this program, components 1, 2 and 3 were immediately administered after patients sampling started, and components 4 and 5 in the form of two educational-motivational sessions (one day after the start of the study and then two weeks later) in a one-by-one form and in the presence of each patient and his/her main family caregiver. In the second session, held two weeks after the start of sampling, patients and their family caregivers received feedback to ensure proper education.

Patient education program: The patient along with his/her primary caregiver were educated about the importance of following treatment regimens in the form of a lecture in the counselling room in the same ward where the patient was hospitalized or in the clinic counselling room to which the patient referred, and then after the lecture was given, educational booklets were given out to them. At first, a brief explanation was given about the underlying disease and the importance of taking drugs. Then, the reasons for quitting the drug stated in the previous stages were recounted and in consultation with the patient and his family care; then the reasons for drug withdrawal were corrected and it was emphasized that the medication regimen should be followed to control the disease and return to normal life. To ensure the adequacy of education and correct the understanding of the patient and his/her family caregiver, questions were asked and the necessary feedback was given to the patients and their caregivers and if necessary, it could be modified. Motivational interview sessions were also held in the counselling room in the same ward where the patient was held or in the counselling room to which the patient was referred, with the patient and the main family caregiver in attendance. Sessions generally consisted of a brief review of the previous session, and then educational presentation.

Motivational interview: During the motivational interview sessions, it was sought to change the patient's behaviour through their main family caregiver in taking drugs, by recognizing the potential problems when consuming the medications and also discovering and eliminating the patient's hesitation in taking the medication as directed. With the help of primary family care, the patient's period of continuous and regular use of medication was increased. During two training sessions, attempts were made to change the patient's attitude towards the harms of not taking the medications and the benefits of their regular and continuous usage, although considered a difficult task, this effort could yield beneficial effects, due to

the importance of increasing drug adherence in these patients.

Motivational session contents: Acquaintance, patient's description of a day after taking medication, discussion of the patient's expectations of medication and the treatment team, identifying factors stimulating or barring psychiatric medication, encouragement of the patient to reward him/herself by regular taking of medications, discussing ways to control temptation and negative desires, discussion of ways to enjoy life and creation daily life activities along with taking medications, creation of a commitment in the patient for regular use of medications, involvement of the patient's family in encouraging and helping the patient to follow the medication regimen.

Motivational-educational sessions schedule: Based on the patient's ability and tolerance to participate in the sessions, the sessions averaged between 30 to 45 minutes.

Control group patients received only the common treatments in the center (medication, occupational therapy and psychotherapy) during the study. One and two months after the start of the sampling, the researcher completed the Morisky Medication Adherence Inventory for the research units of both groups and the patient adherence rate was measured. Assessments were conducted by a trained research assistant who was blinded to the study groups.

Ethical consideration

Ethical approval for this study was obtained from the ethics committee of North Khorasan University of Medical Sciences (IR.NKUMS.REC.1397.117). Also, all participants gave their written informed consent to take part in this study.

Sample size calculation

The sample size was calculated based on a study by Mohebi *et al.*^[24] and using G*Power software with a power of 0.95, two-range independent t-test and error of 0.05. A minimum sample size of 26 patients in each group was calculated. Predicting drop-out rates of 20%, 6 cases were added to the sample size of each group making the number of cases in each group 32.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) software version 16 was used for data analysis. Normality of the data was evaluated using the Kolmogorov-Smirnov test. Descriptive statistics (to summarize the data) and independent t-test, Mann-Whitney, paired t-test, repeated measures analysis of variance, Chi-square and Chi-square Squares tests were used to analyse the data. A *P* value less than 0.05 was considered as a statistically significant level.

Results

In this study, 73 elderly were initially selected. Of these, 6 patients did not meet the inclusion criteria, and 3 patients declined to participate in the study. The remaining 64 patients were randomly allocated to two equal-sized groups. Except for two patients in control group, all other patients completed the study, and data from all these patients were analysed [Figure 1].

The mean age of the intervention group elderly was 69.03 ± 5.75 years and that of the control group was 68.50 ± 6.73 years ($P = 0.42$). Other demographic characteristics of the participants and the result of their homogeneity in the two groups are listed in Tables 1 and 2.

The results of analysis showed that in the intervention group, the scores of medication adherence during the follow-up period was statistically higher than the control group ($P < 0.001$).

With respect to medication adherence, the result of independent t-test suggested that in the stage before the intervention, the mean medication adherence score of the elderly in the intervention and control groups was not statistically significant ($P = 0.960$). However, the result of independent t-test in the stage immediately after the intervention ($P < 0.001$), one month later ($P < 0.001$) and two months after the intervention ($P < 0.001$) demonstrated that the mean medication adherence score of the elderly in intervention group was statistically and significantly greater than that in the elderly in the control group [Table 3].

The analysis of variance results along with repeated measures showed that there was a statistically significant difference between the mean medication adherence score of the elderly in terms of time ($P < 0.001$), group ($P < 0.001$) and the interaction of group and time ($P < 0.001$) [Table 3]. The results of paired t-test for intra-group comparison showed that in the intervention group, the mean medication adherence

Table 1: Comparison of demographic characteristics of the elderly in the two intervention and control groups

Variable	Intervention	Control	P
Sex			
Male	21 (65.6)	15 (50)	0.213
Female	11 (34.4)	15 (50)	
Marital status			
Single	1 (3.1)	2 (6.7)	0.913
Married	19 (59.4)	16 (53.3)	
Deceased	11 (34.4)	11 (36.7)	
Divorced	1 (3.1)	1 (3.3)	
Number of children			
≤2	12 (37.6)	9 (30)	0.814
3-4	10 (31.2)	11 (36.7)	
>4	10 (31.2)	10 (33.3)	
Educational level			
Illiterate	5 (15.6)	10 (33.3)	0.273
Preliminary	16 (50)	15 (50)	
High school	9 (28.2)	4 (13.3)	
Academic degree	2 (6.2)	1 (3.3)	
Having underlying disease			
Yes	29 (90.6)	27 (90)	0.934
No	3 (9.4)	3 (10)	
Number of hospitalization (in year)			
≤2	23 (72.9)	22 (73.3)	0.782
3-4	7 (21.9)	5 (16.7)	
>4	2 (6.2)	3 (10)	

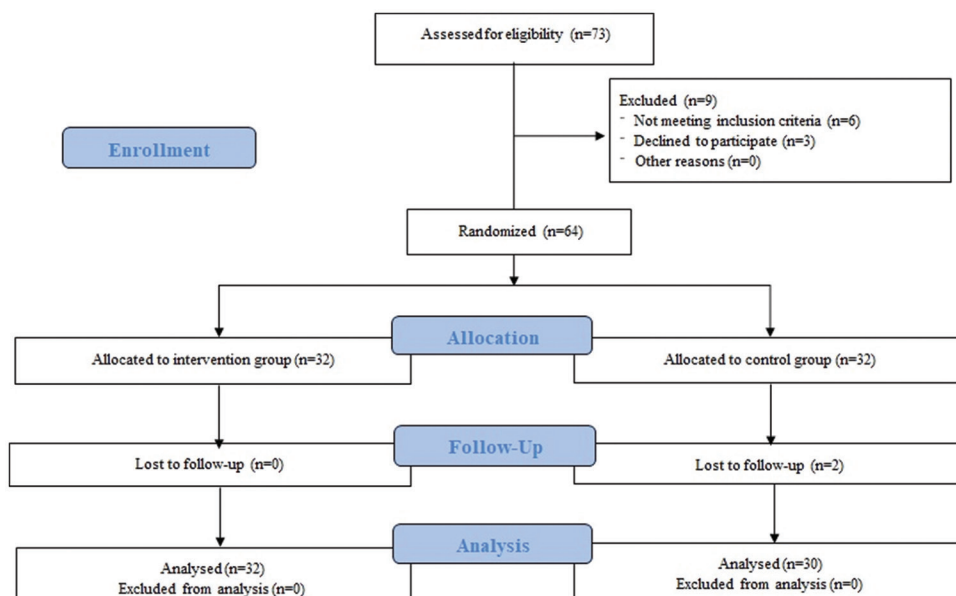


Figure 1: Flow chart of the study

Table 2: Comparison of demographic characteristics of the caregivers of elderly in the two intervention and control groups

Variable	Intervention	Control	P
Sex			
Male	8 (25)	7 (23.3)	0.878
Female	24 (75)	23 (76.7)	
Educational level			
Illiterate	8 (25)	4 (13.3)	0.094
Preliminary	16 (50)	9 (30)	
High school	5 (15.6)	8 (26.7)	
Bachelor degree	3 (9.4)	6 (20)	
Master degree or higher	0 (0)	3 (10)	
Residence			
City	24 (75)	17 (56.7)	0.165
Countryside	8 (25)	11 (36.7)	
Village	0 (0)	2 (6.6)	
Relationships with the patient			
Family member	28 (87.5)	24 (80)	0.537
Friends or relatives	3 (9.4)	3 (10)	
Other people	1 (3.1)	3 (10)	

Table 3: Comparison of mean and standard deviation of medication adherence in the studied elderly in two intervention and control groups

Mean medication adherence score	Mean±SD		P
	Intervention	Control	
Before the intervention	3.71±1.59	3.70±1.24	0.960
Immediately after the intervention	1.04±1.12	3.67±1.49	<0.001
One month after the intervention	1.12±1.23	3.83±1.44	<0.001
Two months after the intervention	1.15±1.17	3.86±1.35	<0.001
Repeated measure ANOVA analysis	Time effect: P<0.001 Group effect: P<0.001 Interaction effect: P<0.001		

score of the elderly was significantly different between the stage before the intervention and immediately after the intervention ($P < 0.001$), before the intervention and one month after the intervention ($P < 0.001$), and before the intervention and two months after the intervention ($P < 0.001$); however, this difference was not significant between the stage immediately after the intervention and one month after it ($P = 0.394$), between the stage immediately after the intervention and two months later ($P = 0.923$) and between one month after the intervention and two months later ($P = 0.395$). In the control group, pairwise comparisons suggested that the mean medication adherence score of the elderly was not significantly different in the stage before the intervention and immediately after the intervention ($P = 0.157$), before the intervention and one month after the intervention ($P = 0.159$), before the intervention and two months after the intervention ($P = 0.120$), immediately after the intervention and one month after

that ($P = 0.893$), immediately after the intervention and two months after that ($P = 0.778$) and one month after the intervention and two months later ($P = 0.801$).

Discussion

The results of the present study demonstrated that after the intervention, the mean medication adherence score in the intervention group saw a significant improvement over the control group. Also, the mean medication adherence score of the elderly in the intervention group had a significant improvement in the post-intervention stages compared to before, while in did not show any significance difference in the control group.

In a study by Fakhri *et al.*^[23] to evaluate the effect of theoretical education on medication adherence in the elderly with hypertension, the results suggested that after the program was implemented in the experimental group, almost half of the subjects were in good condition in terms of adherence to the medication regimen controlling blood pressure, which was significant compared to before the educational intervention, while the control group saw no significant changes in the medication adherence. Sinan and Akyuz conducted a study aimed to evaluate the effect of patient education through home visits on medication adherence of the elderly with diabetes and hypertension. The results showed that after the intervention, the elderly medication adherence had increased significantly.^[32] The results of this study were consistent with the results of the present study. This is because one of the intervention components in the present study was an educational program which aimed to provide awareness and increase knowledge of the elderly in their medication programs. Of course, this program is not merely a training program and in addition to education, it can also affect their attitudes by motivating people, so in the long run, the likelihood of medication adherence in the elderly increases.

The results of a study by Bahredar *et al.*^[33] indicated that group psychological training program was effective in improving medication adherence and global functioning of bipolar patients. The result of this study was found to be consistent with the result of the present study. This is because in both studies, the Morisky inventory was used to assess patient medication adherence. Also, one of the goals of the interventions used in the two studies was to motivate the research units.

Mohebi *et al.*^[24] conducted a study to investigate the effectiveness of community return rehabilitation program on drug adherence of patients with type I bipolar disorder. It has been shown that after the intervention, the mean medication adherence score in the intervention and control groups were significantly

different. Sookhak *et al.*^[34] did a study to “Determine the effect of cognitive-behavioural intervention on the medication adherence regimen of patients undergoing haemodialysis.” The results demonstrated that after the intervention, the mean medication adherence score of patients in the intervention group was significantly greater than that in the control group. The results of these studies were found to be consistent with those of the present study, because the interventions used in the present study and in the above studies were to encourage people with chronic disorders to change their lifestyle,^[35] so it seems obvious that patients with chronic disorders who are trained according to programs and find the motivation to follow their medication plans can gain more adherence to their medication regimen.

Lam *et al.*^[36] conducted a study to evaluate the outcome of the cognitive therapy after 2 years in preventing the recurrence of patients with bipolar disorder. The results of this study indicated that in a period of 30 months, the group receiving cognitive therapy had a better situation in terms of recurrence time due to better medication adherence than the control group. Another study investigate the feasibility of three individual consultations and one phone call with a single health care professional on medical adherence of diabetic patients. The results revealed that this modality and program was feasible, usable, and acceptable to patients and healthcare providers.^[37] Also, the results of a study by Yazdanpanah *et al.*^[38] in older adults with hypertension confirmed the positive efficacy of an educational program on medication adherence in these patients. Miklowitz *et al.*^[39] also did a study to evaluate the effect of family-based psychology education and medication therapy on outpatient management of bipolar disorder. Findings suggested that patients attending family-based education and medication therapy sessions had their mood disorders symptoms greatly reduced while showing better medication adherence during 2 years of follow-up than patients undergoing crisis management. Patients who had better medication adherence were less likely to have recurrences of mania symptoms than patients who had less adherence. The results of these studies were found to be consistent with those of the present study in one and two months after the intervention. Although the follow-up period in the above studies was longer, considering that the comprehensive educational-motivational program used in the present study aimed to encourage people to control and change the behaviours by following their medication and treatment plans, the results of medication adherence of the elderly in one and two months after the intervention did not show a significant difference.

However, in a study by Alhalaiqa *et al.*^[40] it has been indicated that the blood pressure of patients who received

medication adherence program and were trained in the intervention group reduced by 37% compared to the group who received routine training, but no significant difference was observed between the two groups. The results of this study were not consistent with those of the present study. This is because the Alhalaiqa’s study was conducted in Jordan and in three training hospitals and patients with hypertension were studied, but the present study was carried out on patients with bipolar disorder in a medical centre as they have a medical record and received training.

Limitation and recommendation

There are some limitations in the present study that need to be addressed. Our study is a single-centre clinical trial, and therefore selection bias is possible. Another limitation is the non-blinding of the patients, due to the nature of the study.

According to the results of present study, it is recommended that the relevant authorities, in accordance with the conditions and facilities of medical centres and considering their infrastructure, financial resources, facilities and manpower, use this training and care method to improve medication adherence in the elderly with bipolar disorder and ultimately empower them to use self-care and adaptation to the disease. Also, using cutting-edge technology, it is possible to design individual motivational-educational programs to educate the elderly with bipolar disorder about the disease, its complications and the consequences of failing to adhere to treatment programs through mass media and cyberspace.

Conclusion

Considering the positive effect of a comprehensive individual motivational-educational program, this method may offer greater help to the elderly with hypertension to improve their medication adherence, especially patients who have no history of chronic disease and those who do not have enough information about this disease and its potential complications.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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