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Clinical Study

Adherence to prescribed medications of Iranian traditional medicine in a group of patients with chronic disease

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ABSTRACT

Objective: The extent to which a person's health-related behavior corresponds with medical instructions (adherence) is an important modifier of health system effectiveness. This study was designed to determine the patients' adherence to Iranian traditional medicine in a group of patients with chronic disease.

Methods: Convenience sampling was used to enroll 320 patients with chronic diseases from January 2014 to January 2015 in clinics of traditional medicine affiliated with medical universities in Tehran. Morisky Medication Adherence Scale (MMAS) was used to measure the adherence. After describing the variables and the frequency of adherence, logistic regression analysis was used to determine the influencing factors.

Findings: Mean age was 40.8 (standard deviation [SD] =13) years. The mean of the duration of disease was 54.6 (SD = 56.1) months and mean of the duration of referring to the clinics 6.5 (SD = 6.9) months. Total score of MMAS was zero in 33 (10.3%) of patients (high adherence), one or two in 128 (40%) of patients (moderate adherence), and more than two in 159 (49.7%) of patients (low adherence). Forgetfulness, bad taste, not availability, and the high cost of the drugs were the most commonly reported causes of non-adherence. Adherence was associated with age (odds ratio [OR] =1.05, 95% confidence interval [95% CI] 1–1.1), marriage (OR = 10.8, 95% CI 2.05–57.6), number of prescribed drugs (OR = 0.05, 95% CI 0.02–0.14), and duration of disease (OR = 1.01, 95% CI 1–1.02).

Conclusion: Considering the low adherence in users of medications of Iranian traditional medicine, health care practitioners need to be trained in adherence and the influencing factors and also to use some interventions to increase the adherence.

Keywords: Adherence; compliance; Iran; traditional medicine

INTRODUCTION

The participants at the adherence meeting of the World Health Organization (WHO) in June 2001 defined adherence or compliance as "the extent to which a person's health-related behavior corresponds with medical instructions or agreed recommendations from a health care provider."[1] Although most research has focused on adherence to medication; adherence encompasses numerous health-related behaviors. Seeking medical attention, filling prescriptions, taking medication appropriately, obtaining immunizations, attending follow-up appointments, and executing behavioral modifications that address personal hygiene, smoking, contraception, risky sexual behaviors, unhealthy diet, and physical activity are all examples of health-related behaviors.[1]

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Adherence is an important modifier of health system effectiveness.[1] Studies have shown that using medications accurately and corresponding with medical instructions is as important as accurate diagnosis of diseases and prescription of medication.[2,3] Low adherence to prescribed medications is potentially a major barrier to adequate control of diseases, sub-optimal clinical benefit[4-7] and is an important cause of resistance to treatment, medical, and psychosocial complications and hospitalization. It reduces the patients' quality of life, wastes health care resources, and increases health care costs.[8-10]

Poor adherence is especially important in chronic conditions, when a complex drug regimen is prescribed or when a patient has poor knowledge, understanding, and perception of the disease.[8,11-13]

Poor adherence to treatment of chronic diseases is a worldwide problem of striking magnitude. In developed countries, adherence among patients suffering chronic diseases averages only 50%.[1] The frequency of poor adherence in developing countries is assumed to be even higher.[1] It is usual to consider hypertensive patients to be sufficiently compliant with their treatment when they take >80% of their prescribed drugs.[14] Adherence has been estimated to be about 36–93% for oral hypoglycemic agents and 62–64% for insulin (in diabetic patients),[15] 42% of hypertensive patients,[16] and 79% in cardiac patients.[17]

Therapy in Iranian traditional medicine is a package of interventions, including lifestyle modification, special diets, and herbal therapies used in singular or in combination with each other. To achieve the desired therapeutic response, proper observance and adherence of each of the above commands should be considered by patients and physicians. Nevertheless, the providers often do not ask about medication adherence. This may be, in part, because they do not have time, do not think of non-adherence as a likely cause for poor control of diseases and are not in the habit of using this information in clinical practice.

The present study was conducted to evaluate the medication adherence of patients referred to the clinics of traditional medicine.

METHODS

This cross-sectional study was conducted between July 2014 and July 2015. Convenience sampling was used to enroll 320 patients referring to the clinics of traditional medicine affiliated with governmental medical universities in Tehran (Tehran, Iran, Shahed and Shahid Beheshti Universities of Medical Sciences), Iran. According to the results of a pilot study

(60% satisfaction) and taking 0.05 random errors into account and 0.055 precision for estimation of satisfaction, the sample was calculated to be 320. The proposal was approved by the Ethics Committee of the Research Institute for Islamic and Complementary Medicine, and all patients gave their written consent form.

Patients had to be more than 18 years suffering from a chronic disease, with the history of more than 2 months referring to the mentioned clinics and willing to participate.

The adherence project of WHO has defined chronic diseases as diseases which have one or more of the following characteristics: They are permanent, leave residual disability, are caused by nonreversible pathological alteration, require special training of the patient for rehabilitation, or may be expected to require a long period of supervision, observation, or care.[1] We consider the patients with duration of disease more than 3 months for the study. Therefore, the patients with diabetes mellitus, hypertension, and chronic gastrointestinal, respiratory, thyroid gland, musculoskeletal, skin, cardiovascular, renal, and cerebrovascular diseases were included.

Sociodemographic and disease-related information including the duration of disease and the number of prescribed medications, were asked. Morisky Medication Adherence Scale (MMAS) was used which is a self-report scale for measuring the adherence.[3] Medication adherence from starting the medications of traditional medicine until the interview was considered in this study.

The 4-item Morisky–Green–Levine Medication Adherence Scale was developed in 1986 to assess anti-hypertensive medication adherence.[14] Then, the 8-item MMAS was developed. MMAS-4 and the more recent MMAS-8 have both been validated (MMAS-4 alpha reliability = 0.61; MMAS-8 alpha reliability = 0.83), and their concurrent validity has been assessed among hypertensive patients (Pearson correlation = 0.64; $P < 0.05$).[3] They are commonly used, patient-reported questionnaire, simple to understand and easy to administer. These scales have been also used to assess medication adherence in studies of other chronic diseases such as cardiovascular diseases,[18] asthma,[19] diabetes,[20-22] and cancer.[23]

The Persian version of the questionnaire was reviewed by ten specialists in Iranian traditional medicine and methodologists for face and content validity. Measuring alpha reliability was done after a pilot study on 30 patients (similar to inclusion criteria of the main study). Also, the correlation coefficient was calculated after test-re-test. All items of questionnaire were scored as either zero (No) or one (Yes) except of item five which

scored as zero (Yes) or one (No) and the last item which scored zero (Never) and one for other answers.

Scores were summed to calculate the total score. Higher total score means lower adherence to prescribed medications. Ranking of scores was conducted as two or more means poor or low adherence, one and two means moderate adherence, and zero means high or good adherence.[3]

After entering data into SPSS software, Version 17 (SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc.), the description was done by mean (standard deviation [SD]) and the number (percent of frequency) for quantitative and qualitative variables, respectively. The association between variable was analyzed by Spearman correlation, Mann–Whitney U-test and Kruskal–Wallis test. Finally, a logistic regression model was used to determine the factors influencing adherence.

RESULTS

The internal consistency of the questionnaire was confirmed by Cronbach's alpha 0.86, and the correlation coefficient of test-re-test was 0.71. Three hundred and twenty completed questionnaires were analyzed. One hundred and eighty-two (56.9%) patients were female. Mean (±SD) age was 40.8 (±13) years. Thirty-four (10.6%) patients were illiterate, 51 (15.9%) patients were educated under diploma, 111 (34.7%) patients had a diploma, and 124 (38.8%) patients were educated upper diploma. Two hundred and forty-one (75.3%) patients were married. The most frequent complaints were gastrointestinal disorders 82 (25.6%), musculoskeletal disorders 51 (15.9%), metabolic and endocrine disorders 30 (9.3%), hair and skin disorders 29 (9%), headache 28 (8.7%), menstrual disorders 25 (7.8%), and allergic disorders 15 people (4.6%). Other less frequent complaints were obesity, insomnia, anxiety, and anemia. The mean (±SD) of the duration of disease was 54.6 (±56.1) months and mean of the duration of referring to mentioned clinics was 6.5 (±6.9) months. The history for experiencing the conventional treatment before going to the traditional medicine clinics were positive in 286 (89.3%) of participants. The range of prescribed traditional medications was 1 to 5 types and median and mode three types.

The total score of Morisky scale was 0 (means high adherence) in 33 (10.3%) patients, 1 or 2 (means moderate adherence) in 128 (40%) patients and more than 2 (means poor adherence) in 159 (49.7%) patients. Frequency of answers to each question is presented in Table 1.

In addition to forgetfulness (105 [80.2%]), unavailability (26 [19.8%]), and bad taste (11 [3.4%])

Table 1: Frequency of answers to each question of MMAS

MMAS questions	Yes	No
Do you sometimes forget to take your medicine?	167 (52.2)	153 (47.8)
People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	131 (4.9)	189 (59.1)
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	60 (18.8)	260 (81.3)
When you travel or leave home, do you sometimes forget to bring along your medicine?	118 (36.9)	202 (63.1)
Did you take all your medicines yesterday?	185 (57.8)	135 (42.2)
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	31 (9.7)	289 (90.3)
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	88 (27.5)	232 (72.5)
How often do you have difficulty remembering to take all your medicine?	Never/ rarely	Once in a while/ sometimes/usually/ all the time
	249 (77.8)	71 (22.2)

Data presented as number (%). MMAS=Morisky Medication Adherence Scale

of drugs were two major reason for non-adherence in studied patients. The high cost of drugs was expressed by 217 (67.8%) patients but was not expressed directly as a reason for non-adherence.

The correlation coefficient between the age and a total score of the questionnaire was -0.2 ($P = 0.002$); means the total score decreases (or adherence increases) with increasing the age. Mean (±SD) of age was 44.1 (±14.4), 44.6 (±11.5) and 39 (±12.9) in the high, moderate, and poor adherence groups, respectively.

Educational level and marriage status were statistically significantly associated with the total score of the questionnaire ($P = 0.04$). The Spearman's correlation coefficient was 0.37 ($P < 0.001$) and -0.14 ($P = 0.01$), respectively, for correlation between the number of prescribed medications and duration of diseases with the total score of the questionnaire.

Mean (±SD) of the duration of disease were 97.8 (±77.7) months in the high adherence group, 51 (±45.1) months in the moderate adherence group and 49 (±52.8) months in the low adherence group. It means that adherence gets better when the duration of disease increases. Mean (SD) of the total score of the questionnaire in different subgroups of sex, educational level, marriage status, and a number of prescribed drugs is presented in Table 2.

Table 2: Total score of questionnaire in subgroups of sex, educational level, marriage status and number of prescribed drugs

Variable	Subgroup	Total score Mean±SD	P
Sex	Female	2.5±1.8	0.5
	Male	2.7±2	
Marriage status	Single	2.9±1.8	0.04
	Married	2.5±1.9	
Educational level	Illiterate	1.8±1.3	0.04
	Under diploma	2.9±1.9	
	Diploma	2.5±1.6	
	Above diploma	2.9±2.1	
Number of drugs/day	1	1.4±1.9	<0.001
	2	2.4±2	
	3	2.8±1.5	
	4	3.9±1.7	
	>4	4.2±2.4	

Data are presented as mean±SD. SD=Standard deviation

The logistic regression model was used to determine the influencing factor on adherence. Adherence was classified to either appropriate if the total score was zero, or inappropriate if the total score was more than zero. Factors significantly associated with adherence were: Age (odds ratio [OR] =1.05, 95% confidence interval [95% CI] 1–1.1), marriage (OR = 10.8, 95% CI 2.05–57.6), number of administered drugs (OR = 0.05, 95% CI 0.023–0.14), and the duration of disease (OR = 1.01, 95% CI 1–1.02). It means that marriage, higher age and longer duration of the disease can increase the adherence while increasing the number of medications can decrease the adherence.

DISCUSSION

In the present study, about 90% of participants had a low or moderate adherence and only 10% of patients reported high medication adherence. Forgetfulness, unavailability, bad taste, and high costs of drugs were reported as the most common factors influencing adherence. Age, marriage, and duration of disease are directly related to adherence during the number of prescribed drugs conversely influenced adherence.

Other studies expressed the association between adherence and complexity of drugs and the duration of disease.[1,24] Age is also an important factor. In the study for evaluating the medication adherence in a group of diabetic patients in Tehran in 2006, the positive relationship between the age and the adherence was detected. This is probably attributed to the perceived risk of disease in older age.[25] In contrast, some studies demonstrated the reverse relationship between age and adherence. For example,

Gottlieb *et al.* suggested that older patients adhere less and require more treatment recommendations.[26] Poor adherence to treatment among older patients may be due to visual and hearing impairments and therefore lack of full understanding of treatment recommendations, or physical and mental weakness, social issues, sensitivity to the side effects of medicines, or suffering from other illnesses.[2]

Sex is not an important factor affecting medication adherence, according to our study and some other studies in other diseases.[2,25,27] According to the results of the study of Asad *et al.* on patients with borderline personality disorder in 2014,[2] the study on diabetic patients in a sample of French population in 2012[27] and in another study on diabetic patients in Tehran (Iran) in 2006,[25] the relationship between medication adherence and sex was not significant.

Bani Asad *et al.* showed that there is a significant direct relationship between the patients' level of education and adherence to treatment.[2] Several studies have introduced the patient belief in prescribed medicine as one of the predictive factors of the level of adherence to treatment and final success in treatment.[2,28] Patients' adherence to treatment is dependent on their belief about the necessity of the taking medicine and their concerns over its effects.[28]

Medications of Iranian traditional medicine may have bad taste and smell because they originate from plants and minerals. Bad taste and smell of medications can be a factor in the reluctance to use in patients, especially children. Taste and/or odor masking by different approaches appears to be effective in enhancing adherence to traditional medicines.[29]

Many of the prescribed regimens in traditional medicine require preparation by the patient before using (weighing, mixing different amounts of herbs and other materials, soaking, brewing, and other activities). Obviously, the medications are easier to use in the form of tablets or syrup, and it increases patient compliance and decrease the possibility of errors in drug dosing.

Most of the prescribed drugs of traditional medicine are offered in pharmacies in the clinics. Because of the low number of pharmacies and their limited distribution in the city, access to the medications is somewhat limited and this could be one of the influencing factors for non-adherence.

Sometimes, the patients do not purchase part of the prescribed medications due to high cost or lack of medications in the pharmacies.

Previous studies have shown that high cost of treatment is an important factor in non-adherence.[2]

In the present study, more than 67% of participants expressed the high cost of medications. It is possible that some patients avoided buying drugs and readmission to clinics due to the high cost of drugs. In other words, some patients had not been entered the study probably because they avoid using their medications and readmission to the clinics. Obviously, insurance coverage can be a way to reduce the cost of treatment.

This is the first study to measure the adherence to Iranian traditional medicine. One of the limitations of our study is the sampling method. We used convenience sampling method as is done in many similar studies. Obviously, patients who did not refer for continuing the treatment and are not included in the study, are the examples of non-adherent patients.

The Morisky questionnaire measures the medication adherence. The theory underlying this measure was that failure to adhere to a medication regimen could occur due to several factors such as voluntary factors (when they feel better or feel they have complications of medication, the complexity of the medical regimen) or involuntary factors (forgetfulness, neglect, and lack of drugs).[3]

Adherence to other interventions of Iranian traditional medicine, such as diet, lifestyle modifications, and manipulation are also very important and should be considered. Persistence, the continued or prolonged existence of something or how long that patients continue the instructions, is another important issue that is suggested to researchers in the future studies of Iranian traditional medicine.

Approaches employed to assess the medication adherence include patient self-report, pill counts, pharmacy records, drug levels, biological surrogates, and medication event monitoring system. However, the most practical approach to apply in clinical practice is patient self-report. Some believe that pill count, pharmacy-based or insurance-based methods are better.[30] The advantages of assessing the medication adherence by self-report include simplicity, low cost, and speed of use.[22,24,30-33] Overestimation is a limitation of this method and reliability of the self-reporting questionnaire closely depends on the level of literacy and the cognitive ability of individuals.[34] Despite these issues, a meta-analysis of 65 studies has demonstrated that self-reporting is a valid method for assessing the adherence to antiretroviral medications.[35]

Because the lack of accurate records and impossibility to use pill count method, self-report was the only possible method in this study. Another limitation of our study was the small number of related factors of adherence we studied. Some other related factors such as social support, psychological factors, knowledge and attitude about therapies of traditional medicine, and the effect of side effects on adherence should be also evaluated.

There is a growing evidence to suggest that increasing the effectiveness of adherence interventions may have a greater impact on the health of the population than any improvement in specific medical treatments.[28] Adherence is a dynamic process that needs to be followed up. Complex procedures and long-term treatment of Iranian traditional medicine, also patients' insufficient knowledge about traditional therapies, are the factors that can cause low adherence by patients. Therefore, a physician should always take into account and track it.[33]

Health providers can have a significant impact by assessing the risk of non-adherence and delivering interventions to optimize adherence. To make this practice a reality, health professionals need to be trained for adherence.[1,33]

To increase patients' adherence to medications in Iranian traditional medicine, using follow-up methods such as telephone follow-up, effective communication between doctor and educating patients' relatives to supervise their behaviors, increasing patients' knowledge about their disease and the importance of adherence, and the development of insurance for drugs and procedures used in traditional medicine seem valuable.

Considering the low adherence in users of medications of Iranian traditional medicine, health care practitioners need to be trained in adherence and the influencing factors and also to use some interventions to increase the adherence.

AUTHORS' CONTRIBUTION

Fataneh Hashem Dabaghian: Concept, design, definition of intellectual content, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation and manuscript editing. Maryam Rassouli: validation of questionnaire and manuscript review. Jila Sadighi: validation of questionnaire and manuscript review. Roshanak Ghods: validation of questionnaire and manuscript review.

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Conflicts of interest
There are no conflicts of interest.

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