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Clinical Study

Role of pharmacist counseling in pharmacotherapy quality improvement

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ABSTRACT

Objective: Hospitalization and subsequent discharge home often involve discontinuity of care, multiple changes in medication regimens, and inadequate patient education regarding the instruction of drug use, respiratory devices, and disease information and also lack of information about the drug's side effects that can lead to medication nonadherence and low level of treatment satisfaction. Hence, we decided to design a study to determine the effect of patient counseling at discharge and also their follow-up by pharmacist on their treatment satisfaction and medication adherence.

Methods: A total number of 154 patients within the age of 18–65 years old participated in the study from August 2013 to March 2014. Patients in the intervention group received pharmacist counseling and necessary education about their prescribed medications at discharge. We set up two follow-up schedules for this group and one for control group, and then we compared the medication adherence and satisfaction in two groups. The primary outcome of this study was a significant increase in adherence to medication regimen and treatment satisfaction of the case group compare to control group after the intervention of pharmacist at the time of discharge.

Findings: There were significant differences in medication adherence and satisfaction between the groups at the time of second follow-up. Medication adherence in the study group is 42.9% more than the control group, also the treatment satisfaction determined to be 33.5% more than patients in control group. Furthermore, we found that, in intervention group, no one is readmitted while among the patients in control group eight people readmitted.

Conclusion: Counseling patients at the time of discharge and regular follow-up improves patient's medication adherence and treatment satisfaction and consequently improves clinical outcomes.

Keywords: Medication counseling; patient's education; respiratory diseases

INTRODUCTION

Medicines play an important role in medical care and effectiveness of treatment depends on both the efficacy of medication and patient adherence to the therapeutic regimen.[1] Adherence to medications (AMs) is essential to achieve the best possible pharmacotherapy outcomes.[2] Evidence shows that non-AMs result in higher health care costs, longer hospitalization, and increased morbidity and mortality.[2]

On the other hand, hospitalization and subsequent discharge home are high-risk periods for potential

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medication confusion and errors[3] and often involve discontinuity of care, multiple changes in medication regimens, and inadequate patient education, which can lead to adverse drug events (ADEs) and avoidable health care utilization.[4] Patient's transition from hospital to home, subsequently changes to their previous medication regimens, and also nonadherence to prescribed medication after discharge are common during these transitions of care and increase the risk of postdischarge complications.[3,5,6]

It has been reported that one in five hospitalizations is complicated by postdischarge adverse events, and 66% of these events are related to medications.[3]

Numerous factors have been identified to affect AMs,[2] including cognitive impairments, lack of understanding and knowledge about health condition,[7] higher prevalence of chronic diseases, higher number of prescription and nonprescription medications,[6] complexity of the regimen and poor access to medicines,[2] poor provider-patient communication, inadequate knowledge about a drug and its use, not being convinced of the need for treatment, fear of adverse effects of drug, and finally long-term drug regimens.[1,2] In addition, 33–69% of medication-related hospital admissions in the United States are due to medication nonadherence with a result in cost of approximately $100 billion per year.[6]

Medication adherence is a complex behavior which can be influenced by patients, providers, and health system factors.[1,2] A single method cannot improve medication adherence. Instead, a combination of various adherence techniques should be implemented to improve patient's adherence to their prescribed treatment.[1] Several interventions including reminder systems, follow-up programs by health care providers, and information technology tools have been developed to overcome patient and health care provider-related barriers.[2]

Pharmacists are poised to play an important role in improving medication management during transitions of care and reducing readmission rates.[5] Pharmacist's interventions (also known as pharmaceutical care plans) are means of solving the drug therapy problems identified in pharmaceutical care.[8] Pharmaceutical care requires direct relationship between a pharmacist and an individual patient.[9]

Pharmacists responsibility is to optimize patient's medication therapy.[8] In order to that, they have the potential to educate patients about the importance of continued therapy and adherence at home also to resolve any uncertainties that patients may have regarding their medications.[7] Patient's medication discharge counseling provides an opportunity for pharmacists to improve patients' therapeutic outcomes.[10] Pharmacist follow-up after discharge has mixed effects on Emergency Department (ED) visits, hospital readmission, and costs.[4] Our objectives were to identify the effect of patient counseling at discharge and their follow-up by pharmacists on treatment outcomes.[4]

METHODS

Patients were randomized to intervention and control groups by block randomization method in an observation-intervention study. This randomized controlled study was conducted in the respiratory ward of Shariati Hospital, Tehran, from August 2013 to March 2014. The primary objective of the study was to determine the effect of patient education, and intervention program initiated by pharmacist to the patients before discharge on their adherence to therapeutic regimen and pharmacotherapy outcome.

Two hundred patients derived from admitted patients in the respiratory ward of Shariati Hospital. Patients were 18–65 years of age and the patient himself or his caregiver were able to write and read in Persian language were included in the study. They were excluded unless they would meet at least one of the three following conditions: Discharge by three medications or more, discharge by any target drugs (inhalers, anti-hypertensive, digoxin, or antiplatelets), and minimum duration of stay at hospital for 2 days. In addition, those who were missed by pharmacist at discharge or expired were excluded from the study.

Pharmacist identified hospitalized patients who were eligible to enter the study. The patients were block randomized to intervention and control groups. Each patient's file observed by pharmacist at time of admission and the patient history form which is prepared by pharmacist was filled. The rest of information including all the medications that he/she used just before admission was asked to register in the form. At discharge, prescribed medications of both groups were registered in patient history form.

The pharmacist intervention on the day of discharge consisted of several parts:

1. Patients education and information on health condition and drug therapy; the education component included medication counseling on all prescribed medications, inhaler technique assessment, verbal education, side effects of drugs, and provision of written asthma education materials
2. Comparison of discharge medication with preadmission regimens and reconciliation of discrepancies with the medical team's help

3. Screening of previous drug-related problems, including nonadherence, lack of efficacy, and side effects
4. Review of indications, directions for use, interactions, importance of AM regimen and potential adverse effects of each discharge medication with the patient, and discussed significant findings with the medical team.

In case of any inhaler device is prescribed, the patient were asked to show the instruction of use step by step and each step has been marked in the instruction paper, and then pharmacist used the face to face education to show the correct inhaler technique to the patient. After education, patients were asked to show the correct technique of use step by step. Pharmacist must repeat the instructions until make sure that the patient learned the method correctly.

The pharmacist's contact information was provided to the patients in intervention group, and they have been told to call the pharmacist in case they have any question regarding their discharge medication.

Patients in control group were discharged without any intervention, and they had no access to the pharmacist.

Two follow-up schedules had been set up by pharmacist for the intervention group, and one for the control group. First follow-up for the intervention group includes a telephone call follow-up, after 2 weeks of discharge by the pharmacist to determine if patient follows discharge medication's instruction of use. At this time, pharmacist compared the patient's self-reported medication list with the discharge list, exploring any discrepancies. Patients were asked about medication adherence and scored them by the medication adherence rating scales (MARS) questionnaires (10 questions) and asked the score of patient's treatment satisfaction out of 10, possible ADEs, and the date of the next clinic appointment. Pharmacist registered all these in the patient history form.

Second follow-up schedule was at the time of clinic appointment which is usually 1 month after discharge for both groups. This is done for both control and intervention groups. The pharmacist met patients in the clinic and checked discharge medications, assessed the inhaler technique, and marked the correct steps in inhaler instruction form. Patients were asked about the medication adherence (MARS questionnaire) and treatment satisfaction and were scored out of 10. In both follow-ups 1 and 2, patients were asked about the frequency of albuterol inhaler usage since discharge.

RESULTS

The number of 154 out of 200 patients who enrolled in our study fulfilled the conditions at discharge and stayed in the study; the rest were excluded. Seventy-eight patients received pharmacist interventions, and 76 were usual care (control group). The flow of participants through the study is shown in Figure 1.

In this study, total male count is 90 (58.4%) and total number of female is 64 (41.6%). There were 46 males in control group and 44 in intervention group. The mean age of participants was 53 years old, and the mean weight of them was 73 kg. Thirty patients in this study carried high-risk jobs, and this number is the same in both groups. The two groups were well matched with regard to demographic and clinical characteristics. Groups did not differ significantly with respect to smokers [Table 1].

Adherence to controller medication during the study, as judged by the MARS questionnaires, was higher in the intervention group compared with the control group.

In follow-up 2, medication adherence was 42.9% more in patients in intervention group compared to patients in control group. According to our findings in this study, the mean standard deviation of the medication adherence for intervention group in the second follow-up was 93.2, but in the control group was 50.3 ($P < 0.01$). Treatment satisfaction also was significantly higher in intervention group than control group, in the intervention group in follow-up 2 was 83.5 while in the control group was 50.0 [Table 2]. Treatment satisfaction and medication adherence were increased in intervention group in follow-up 2 compare to follow-up 1 [Table 3].

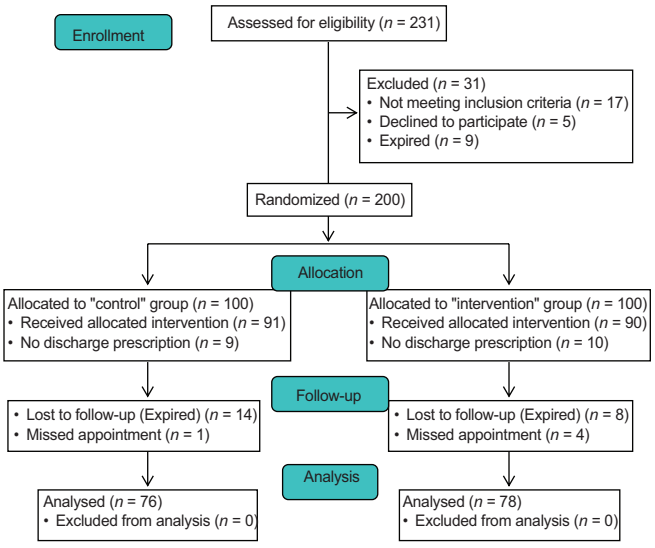

Figure 1: Flowchart of participants

Table 1: Demographic information of groups

Variables	Intervention (*n*=78)	Control (*n*=76)	*P*
Age	52.3±13.1	54.8±13.8	0.261
Gender			0.627
Male	44 (56.41)	46 (60.52)	
Female	34 (43.58)	30 (39.47)	
Weight	75.2±16.0	70.8±10.0	0.04
Occupation			0.796
High-risk job	15 (19.23)	15 (19.73)	
Normal job	11 (14.10)	8 (10.52)	
Jobless	52 (66.66)	53 (69.73)	
City of living (Tehran)	50 (64.10)	52 (68.42)	0.612
Marital status			0.606
Married	71 (91.02)	67 (88.15)	
Single	7 (8.97)	9 (11.84)	
Diagnosis			0.537
Asthma	17 (21.79)	10 (13.15)	
COPD	14 (17.94)	17 (22.36)	
Pneumonia	26 (33.33)	26 (34.21)	
Other	20 (25.64)	22 (28.94)	

Data presented as mean±SD, or *n* (%), where applicable. SD=Standard deviation, COPD=Chronic obstructive pulmonary disease

Table 2: Comparison of rate of adherence and satisfaction between intervention and control groups in follow-up 2

Variables	Intervention (*n*=78)	Control (*n*=76)	*P*
Treatment satisfaction 2	83.5±13.7 (103.59)	50.0±16.2 (50.06)	0.012
Medication adherence 2	93.2±9.2 (98.78)	50.3±27.1 (54.35)	0.010

Data presented as mean±SD (mean rank). Treatment satisfaction 2 is the satisfaction rate obtained in follow-up 2; medication adherence 2 is the adherence rate obtained in follow-up 2. SD=Standard deviation

The rate of medication-related ED visits or hospital readmission was 0 in the intervention group and 8 in those assigned to control group, where 8 subjects in study group and 14 in the usual care group were expired within 1 month after discharge from hospital.

The information about number of discharge drugs has been shown in Table 4. In this study, as the number of prescribed drugs, inhaler devices, and frequency of use of medicines increased, the AM regimen decreased. The result of multiple linear regression between medication adherence as a dependent variable and independent variables shows a significant correlation in decreasing the rate of adherence and satisfaction by increasing the number of common (QD) used drugs (P = 0.14). The reason could be because of the fear of patient for taking the several medicines once a time during the day.

Table 3: Comparison of adherence and satisfaction in follow-ups 1 and 2 in intervention group

Variables	Follow-up 1	Follow-up 2	*P*
Treatment satisfaction	75.9±13.2 (62.97)	83.7±13.7 (90.85)	0.013
Medication adherence	88.2±16.0 (70.80)	93.3±9.2 (84.03)	0.047

Data presented as mean±SD (mean rank). SD=Standard deviation

Table 4: Prescribed medication at discharge

Variables	Intervention (*n*=78)	Control (*n*=76)	*P*
Number of prescribed drugs	2.8±2.2	3.0±2.5	0.617
Number of prescribed devices	1.9±1.3	1.4±1.3	0.031
PRN	0.6±0.7	0.6±0.7	0.741
QD	1.3±1.2	1.5±1.5	0.362
BID	1.9±1.5	1.6±1.3	0.178
TID or more	0.9±0.8	0.8±0.85	0.357

Data presented as mean ± SD. SD=Standard deviation. PRN=The medications which should be used as needed, QD=The medications which prescribed once daily, BID=The medications which prescribed twice daily, TID or more=The medications which prescribed three times or more daily

DISCUSSION

The present study reports the lack of education by pharmacist and other health care providers to patients regarding the correct use of prescribed drugs specially inhaler devices and also its impact on patient's AM regimen. In this study, pharmacist's counseling regarding the prescribed medicines at discharge and 1 month follow-up schedule after discharge leads to positive therapeutic outcomes. The primary outcome of this study was significantly increased in rate of medication adherence and subsequently treatment satisfaction of the intervention group compare to the control group. We should take this issue into consideration that patients were educated about the details of each prescribed drug and the technique of use of inhaler devices and the importance of AM regimen in optimizing patient's quality of life.

Several studies have highlighted the value of supervision of pharmacist in the therapeutic outcome,[11] so to support patient, pharmacist should ensure about the appropriateness of the pharmacotherapy plan and in addition to that patient must be aware of the costs, side effect and monitoring plan regarding the treatment. Education about the correct and proper use of inhalers is the main point in prescribing these drugs. To optimize the efficacy of medicines, doctors and other health care providers must educate patients.

In this study, asthmatic and chronic obstructive pulmonary disease patients who used inhalers

or other inhalation devices did not have enough knowledge about the correct techniques of the use of devices. By educating these patients and comparing their methods of use before and after counseling, there was a significant difference in therapeutic outcome and efficacy of drug in disease control. Educating the patients can also affect the rate of hospital readmission or ED visit, which in this study among the intervention group within the 1 month follow–up, there was no readmission while among the control group eight patients were readmitted. Regarding this issue, similar results obtained from the study in Saudi Arabia in the year 2013 which shows incorrect use of inhalers due to lack of education lead to decrease drug delivery, patient's regimen adherence and drug effectiveness, and multiple ED visits.[12] In this study, more than half of the patients did not use the devices properly and those who used correctly were educated by doctors so one of the most important factors in following the instruction of medicines is education.[12]

In this study, regarding inhaler use, specially inhaled corticosteroids (ICS) patient's information was very limited where in control group most of them got mouth *Candida* due to missed mouthwash step after ICS use and that was a barrier itself for adherence to inhaler use.

In a similar study in Iran-Yazd which is performed by Rahim *et al*. in year 2013 with the results similar to the present study showed most of the patients (55.4%) did not use their ICS and after investigating the reason, it is founded the lack of information about the prescribed drugs and health conditions and this issue influences the medication adherence and the efficacy of drug in disease control.[13] Reports from another article present educating the patients to use the medicines properly are the main strategy in asthma control program.[14] In this study, ICS has been prescribed for almost all patients, but those who were in intervention group showed 15% more medication adherence than control group.[14]

Patients' beliefs and practices play important role in understanding, defining, and responding to illness, due to that it is important to understand such beliefs that may vary between ethnic groups. Patients often use alternative medicines and practices alongside conventional medical ones, and clinicians should be aware of these to optimize health education and clinical management.[15]

In this case, educating the patient about the optimal condition and the goal of therapy is necessary. This study showed patients in control group did not have any information about the optimal conditions, trigger factors, and how to avoid these factors. In this case, we can review the study performed by Heidarnazhad and Tavasoli in 2009 where many patients with a history of using inhalers did not use them regularly (41.9%); the major reason reported was feeling no need to use medication during symptom-free intervals.[15]

In the present study, only 32 (30.5%) patients demonstrated the correct technique for using their oral inhaler. Hence, patients with respiratory conditions need more education about prevention and control of symptoms.[15] Other factor that has been influenced by education in this study was rate of treatment satisfaction. The satisfaction in the intervention group was significantly higher than control group.

Another factor that affects the AM is to set the regular follow-up schedule for patients. That is directly related to medication adherence. The study showed patients in intervention group had very good feeling that someone from the medical team checked the prescription and provided them the necessary information about their health condition and drugs. The results in follow-ups 1 and 2 showed that the rate of medication adherence of intervention group in the follow-up 2 is elevated comparing to follow-up 1 and this shows the importance of regular and continuous follow-up.

Education and knowledge of patients to proper use of medicines and subsequently positive therapeutic outcomes and disease control could encourage patients in medication adherence. In addition to that, the pharmacist's follow-up and reminder in the intervention group is another contributing factor in medication adherence and optimal therapeutic outcomes.

Similar to that is the study performed by Bilan and Ghafari in 2007, which is done on children group.[16] This study shows the different rate of medication adherence between the similar groups in children. Both groups were asthmatic children. There has been education program and regular follow-up visits set up for Group 2, so the outcome of the study shows 50% in Group 1, and 84.3% in Group 2, increase in rate of medication adherence. This affects the treatment satisfaction as well. In the present study, rate of satisfaction in the intervention group at the time of second follow-up was more than control group at the same time and this shows the pharmacist's impact, education and the follow-up schedule provided to patients in this group.

Similar to the results from a study performed in 2012 by Mirsadraee *et al*.,[17] the rate of medication adherence in female patients was more than male in this study also as the age is increased, the rate of medication adherence is elevated as well.

It is obvious that patients with lack of knowledge about their health condition, therapeutic regimen, and AM cannot follow the instruction of medication use. On the other hand, counseling and education program result in minimizing the therapeutic cost and satisfaction of patient and medical team. Pharmacists by teaching the patients how to use their inhaler devices properly and regularly checking the technique during treatment could play an important role in this area (especially when therapeutic goals are not met).[14]

AUTHORS' CONTRIBUTION

Y. Sanii collected the patients' data and interpreted the findings and drafted the manuscript; H. Torkamandi and N. Hadavand conducted the data analysis and provided revision of the manuscript for important intellectual content; K. Gholami and M. Javadi contributed in conception, study design and revising of the manuscript. All authors critically reviewed content and approved of final version for publication.

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Conflicts of interest
There are no conflicts of interest.

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