Effect of a Patient Education Intervention on Asthma Control and Patient-Doctor Relationship

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To the Editor: Asthma control is the focus of modern asthma management, while only 2% of Chinese patients are controlled.[1] A good patient-doctor relationship is one of the first steps in the successful management of asthma; patients can know more information about their condition and the processes of their health through talking thoroughly with doctors. Due to large numbers of outpatients, most physicians in China spend no more than 5 min with a patient in clinics, limiting the opportunity to give the appropriate treatment and discuss further knowledge about asthma with the patients.[2]

We conducted a randomized parallel-group controlled design to compare the intervention of a simple and brief patient-centered 20-min educational session provided by a research assistant who was trained by a specialized educational institution with the usual care of clinic visits. The Second Xiangya Hospital of Central South University institutional review board approved the study (No. 201503012). The study was registered in the Chinese Clinical Trial Registry (http://www.chictr.org.cn; ChiCTR-OPC-15006416). Written informed consent was obtained from all participants.

A total of 205 patients were screened, while five were not enrolled (two were hospitalized and three refused to participate). A total of 200 patients were randomized using a random number generator and allocated to intervention versus control groups at a ratio of 1:1. Blinding of participants and research assistant was not possible. Patient's clinicians were unaware of the treatment assignment. Patients who visited the outpatient respiratory clinic first time in the Second Xiangya Hospital of Central South University between June and December 2015 were recruited. All the study measurements were conducted at this hospital. The inclusion criteria for patients included: (1) ≥18 years of age, (2) meeting the diagnostic criteria for asthma based on the Global Initiative for Asthma,[3] (3) willingness to provide informed consent, (4) patients who visited our clinic first time and had previously visited other clinics within the past month, and (5) no communication disorders. Asthma diagnosis was based on typical symptoms and reversibility in forced expiratory volume in the first second (FEV1) >12% of predicted value and >200 ml from baseline, 10–15 min after 200–400 mg albuterol.[3] The exclusion criteria included having a recorded diagnosis or self-reported pulmonary diseases other than asthma, such as chronic obstructive pulmonary disease, tuberculosis, pulmonary fibrosis, lung cancer, bronchiectasis, or psychological/mental health disorders.

Two research assistants were placed in clinics. One collected questionnaires, and the other provided the education. Clinic flow for all patients included an initial visit with a physician, followed by pulmonary function testing, and a return to the same clinician to review medical results and receive medications. Following the first clinic visit, subjects were screened as they finished the pulmonary function testing. Individuals who met the inclusion/exclusion criteria were asked to participate. After that, patients completed the baseline questionnaires including the asthma control test (ACT, a minimally clinically important difference for the ACT scores was considered to be three points[4]), the Patient-Doctor Relationship Questionnaire (PDRQ, including three parts: (1) patients' satisfaction with physicians, (2) how approachable the physicians are, and (3) patient's awareness of their disease. In the Chinese edition, lower scores of PDRQ indicate a better relationship[5], the Asthma Quality of Life Questionnaire (AQLQ, with the 32 questions on a 7-point scale, from 7 = no impairment to 1 = severe impairment; the global score was calculated as the mean response to all questions, higher scores of AQLQ were better[4]) and the Morisky questionnaires (the adherence in our study was mainly for inhalation, lower scores of Morisky were better[6]). After filling all questionnaires patients were subsequently randomized into two groups. The PDRQ at baseline referred to patients' experiences at clinics before coming to our clinic. After finishing this time visit, patients in the intervention group were educated by a specialized research assistant. All subjects needed to complete the PDRQ again, in the end, focusing on the current clinic provider at our clinic. One month after the clinic visit, AQLQ, ACT, and Morisky

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Access this article online

Quick Response Code:

Website: www.cmj.org

DOI: 10.4103/0366-6999.230736

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Received: 31-01-2018 **Edited by:** Qiang Shi
How to cite this article: Zeng YQ, Au DH, Cai S, Carey E, Jiang F, Chen Y, Liu ZJ, Chen P. Effect of a Patient Education Intervention on Asthma Control and Patient-Doctor Relationship. Chin Med J 2018;131:1110-2.

questionnaires were filled out through a telephone interview by a research assistant for all patients.

We calculated the sample size needed to ensure 80% power to detect a significant change in the primary outcome of ACT scores. We used G*Power 3.1 statistical software (Faul, Erdfelder, Lang, and Buchner [2007], Germany) to assume beta of 0.2 and two-sided alpha of 0.05. We detected an effect size of Cohen's D was 0.4, showing a moderate effect. The total number of patients required was 200. To compare the difference between participants' demographics and baseline measures in two groups, we used an independent *t*-test to analyze the normality and the Wilcoxon-Mann-Whitney test for non-normality. For the primary and secondary outcomes of ACT scores, PDRQ scores, AQLQ scores, and Morisky scores, we used independent *t*-tests to compare the differences. The SPSS software (SPSS for Windows, version 21.0, IBM-SPSS, Chicago, IL, USA) was used for all statistical analyses. Statistical significance was set at a $P < 0.05$.

We randomized 100 participants respectively to the intervention group and the control group. Among the 200 patients initially included in the study, 12 (6%, 10 patients in the control group, 2 patients in the intervention group) had disconnected telephones after 1 month of follow-up. There were no significant differences between the intervention group and the control group for the baseline characteristics, such as age, sex, educational level, and the level of hospitals previously visited ($P > 0.05$). Similarly, no important significant difference existed in the medication use, duration of asthma and initial pulmonary function (including the percentage of predicted normal values of FEV1 and ratio of percentage of FEV1 and forced vital capacity) at baseline ($P > 0.05$).

The primary outcome was asthma control (using the ACT[4]). At baseline, the total percentage of patients who were in well control was 12.5%, and there were no significant differences in ACT scores between the intervention group and control group ($P = 0.304$). At follow-up, both groups showed significant improvement in asthma control. In addition, patients in the intervention group showed greater improvement in ACT scores than those in the control group at 1 month of follow-up ($P = 0.019$; Table 1).

Secondary outcome measures were the patient-doctor relationships (using the PDRQ[5]), the quality of life (using the AQLQ[4]), and the medication adherence of the patients (using the Morisky questionnaire[6]). There were no significant differences of PDRQ scores at baseline between the intervention group and control group ($P = 0.511$). However, at follow-up, the patients in the intervention group had more significantly improvement in their PDRQ scores compared to the control group ($P < 0.001$). Similarly, the AQLQ scores were all higher during the follow-up than the baseline in both groups. However, the intervention group showed significantly greater improvement in AQLQ scores than the control group ($P = 0.007$). The intervention group also demonstrated higher medicine adherence than the control group ($P < 0.001$; Table 1).

Asthma education is a major component of asthma management. Our education, which was carried out in the outpatient pulmonary clinic, had been effective in asthma control. With the educational intervention during the clinic visit, most patients had higher ACT scores compared to the usual clinic care. While the change in ACT scores of additional education was less than three points, this may be on account of the short time of follow-up. Regardless of treatment and whether educated by the assistant in our study or not, all patients had clinically meaningful higher ACT scores at follow-up. This may reveal that clinic visit with appropriate treatment could improve the asthma control.

Table 1: Scores of questionnaires for asthma patients

Scores	Intervention group	Control group	*t*	*P*
ACT	*n* = 98	*n* = 90		
Baseline	15.09 ± 3.77	15.72 ± 4.17		
Follow-up	20.56 ± 1.37	19.73 ± 2.30		
ΔACT	5.46 ± 3.99	4.01 ± 4.44	2.370	0.019*
PDRQ	*n* = 99	*n* = 100		
Baseline	42.45 ± 6.30	43.07 ± 6.64		
After visit	28.07 ± 6.06	36.95 ± 6.30		
ΔPDRQ	14.51 ± 8.23	6.17 ± 8.22	−7.145	<0.001*
AQLQ	*n* = 98	*n* = 90		
Baseline	4.78 ± 0.81	4.86 ± 0.81		
Follow-up	6.59 ± 0.40	6.33 ± 0.69		
ΔAQLQ	1.81 ± 0.83	1.47 ± 0.83	2.735	0.007*
Morisky	*n* = 98	*n* = 90		
Baseline	2.69 ± 1.26	2.63 ± 1.14		
Follow-up	0.45 ± 0.86	1.28 ± 1.17		
ΔMorisky	−2.24 ± 1.41	−1.34 ± 1.39	−4.351	<0.001*

Data are shown as mean ± standard deviation.*Comparison of control and intervention groups: Tested by independent *t*-test, $P<0.05$. ACT: Asthma control test; PDRQ: Patient-Doctor Relationship Questionnaire; AQLQ: Asthma Quality of Life Questionnaire; SD: Standard deviation.

Patient-doctor relationship plays a key role in disease care. Short time or lack of willingness to spend time in talking with patients leads to inadequate communication between doctors and patients. Currently, it is difficult to prolong a doctor's visiting time, because of a large number of patients requiring treatment every day. In our research, through oral educational intervention provided by a specialized assistant, knowledge can be communicated thoroughly by building a trustworthy relationship between patients and health-care providers. Patients knew more about the correct use of medicine, especially inhaler agents, the prognosis of asthma and the importance of medicine. Eventually, the adherence of medicine, especially inhaler agents, was improved effectively.

Improving life quality of asthma, reflected in decreasing exacerbation and improving asthma control, is the ultimate purpose for all intervention methods. In our research, all patients' life quality was improved, which may be on account of reasonable treatments and authority of large-scale university hospital. However, life quality of patients with additional education was better than those who without.

Our study has several limitations. There was only one given time to calculate the effect of the intervention. We speculate it may be persistently effective as time goes on. On the other hand, patients were followed up through phone calls to fill in questionnaires during the follow-up. This may be more difficult in communication; we had arranged the same person who collected the questionnaires at our clinic to make telephone calls for follow-up to minimize this effect. Moreover, it was not possible to blind patients during the educational session.

Several study strengths are worth noting. Our intervention is simple and can be made available at many hospitals. Randomization succeeded in producing balanced study groups, and there was no difference in the baseline characteristics between groups, such as

duration of asthma and lung function. In particular, the bias of medicine used at baseline and follow-up was eliminated through the randomized clinical trial. The response rate of the questionnaire was high.

The simple and brief patient-centered education during clinic visit provided by a specialized assistant can improve asthma control, patient-doctor relationships, quality of life, as well as adherence to medicinal treatment plans. The educational intervention used for asthma patients at the outpatient clinic is practical and effective, suggesting that, adoption by hospitals, especially large-scale teaching hospitals serving similar populations or other patients, would be feasible and beneficial.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for 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.

Financial support and sponsorship

This work was supported by a grant from the National Key Clinical Specialty Construction Projects of China.

Conflicts of interest

There are no conflicts of interest.

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