The Pharma Innovation Journal 2017; 6(4): 33-35

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating 2017: 5.03
TPI 2017; 6(4): xx-xx

www.thepharmajournal.com
Received: 16-02-2017
Accepted: 17-03-2017

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Adherence to continuous inhalation therapy in patient with chronic obstructive pulmonary disease, living in the Dnieper region

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Abstract
Treatment of patients with chronic obstructive pulmonary disease (COPD) in stable phase of the pathological process involves continuous inhalation therapy. However, according to the studies, adherence to regular use of inhalers varies from 30 to 50 %.
The aim: determine the adherence to continuous inhalation therapy in patients with COPD, living in the Dnieper region.
Materials and Methods: we have examined 60 COPD patients. Examination of patients included general clinical methods, assessment of the regularity of visits to «Spiro» office, spirometry. Adherence to the drug therapy was determined by 8-item Morisky Medication Adherence Scale (MMAS-8).
Results: the level of adherence of COPD patients depends on the regularity of contact with the doctor and does not depend on gender. The main cause of non-adherence of COPD patients is the fact that sometimes patients forget to take medication, among other reasons there are major financial difficulties. The risk group as to the reduced adherence to inhalation therapy includes patients with vague bronchial obstruction. Given the difficulty of obtaining adequate responses to some questions of MMAS-8, one should consider the necessity of developing a new questionnaire for these patients.

Keywords: Chronic obstructive pulmonary disease, adherence to inhaled therapy, 8-item Morisky Medication Adherence Scale.

1. Introduction
Currently, one of the most urgent problems of medicine, according to the World Health Organization, is the lack of patients' adherence to drug therapy [1].
The low level of adherence in patients with chronic diseases is the main cause of reduced expression of therapeutic effect; it significantly increases the probability of complications, leading to the decrease in quality of life and increased healthcare costs [2]. Experts estimate, that the long-term adherence of patients to any treatment regardless of disease does not exceed 50 % [1]; among patients with chronic diseases, this figure ranges from 43 to 78 % [3, 4]. Patients with chronic obstructive pulmonary disease (COPD) are no exception, and they are included into the group with the lowest level of adherence [5].
COPD refers to the disease with vague clinical symptoms in the stable phase of the pathological process, especially in early stages. Most studies have shown that chronic diseases without manifested symptoms are predictors of poor adherence to drug therapy. The absence of acute symptoms reduces the motivation of patients to long-term use of medications [6].
Treatment of patients with COPD in stable phase of the pathological process involves continuous medication intake [7]. Preference is given to inhalation administration, as it provides the direct penetration of the drug in the airways, and thus facilitates more effective medication exposure and reduces the potential risk of adverse systemic effects. However, according to the studies, adherence to regular use of inhalers varies from 30 to 50 % [8]. The low adherence to inhalation therapy in patients with COPD was identified as the main factor that leads to emergency hospital admission to in-patient department [9, 10].
Of particular importance is the problem of non-adherence to medical advice under the conditions of economic crisis, when there is the deterioration in adherence and increased morbidity because of declining real incomes and increased cost of drugs [11]. Insufficient adherence to treatment is also caused by the reduction of tax benefits for drugs, and this in turn affects the efficiency of therapy [12]. According to the research, the lowest adherence was observed in patients who live alone, the highest – in patients whose relatives were able to pay for expensive drugs [13].

The aim of our research was to determine the adherence to continuous inhalation therapy in patients with COPD, living in the Dnieper region.

2. Materials and Methods

We have examined 60 COPD patients in stable phase of the pathological process during at least two months. The patients were observed for a long time in the regional consultative-diagnostic office «Spiro» of Municipal institution «Dnipropetrovsk City Clinical Hospital No. 6» of Dnipropetrovsk regional council.

Since in all examined patients the diagnosis of COPD was already verified (according to the Order of Ministry of Public Health of Ukraine as of 27.06.2013 No. 555) [14], the consultant doctor at «Spiro» office scheduled the regular visits (once every 2-3 months, and if necessary) in order to control the ventilation function of the lungs, accuracy of inhalation technique of drugs and, if necessary, to correct the treatment regimen.

Patients were aged from 47 to 84 years (average age – 65.4 ± 1.0 years), disease duration ranged from 1 to 36 years (average duration – 7.3 ± 0.8 years); there were 50 (83.3 %) men and 10 (16.7 %) women.

Examination of patients included general clinical methods (collection of complaints, anamnesis, physical examination), assessment of the regularity of visits to «Spiro» office, spirometry with definition of forced expiratory volume in the first second (FEV_1) before and after tests with bronchodilators (salbutamol – 400 mcg), forced vital lung capacity (FVC) using the unit «Master Screen Body / Diff» («Jaeger», Germany).

In all patients with COPD, FEV_1 / FVC level was less than 0.7. Three (5.0 %) patients had bronchial obstruction of I degree (FEV_1 – (91.3 ± 2.9) % pred.), 20 (33.3 %) – bronchial obstruction of II degree (FEV_1 – (60.2 ± 2.2) % pred.), 34 (56.7 %) – bronchial obstruction of III degree (FEV_1 – (40.2 ± 1.7) % pred.) and 3 (5.0 %) – bronchial obstruction of IV degree (FEV_1 – (25.0 ± 1.7) % pred.).

Adherence to the drug therapy was determined by Morisky-Green questionnaire (8-item Morisky Medication Adherence Scale (MMAS-8)), which includes eight questions (questions are listed in Table 1) [15]. Upon scoring 0 – 5 points, the low level of adherence was established; 6 - 7 points – the medium adherence; 8 points – the high level of adherence to inhalation therapy [15].

All patients received medical treatment according to clinical group of COPD in concordance with the Order of Ministry of Public Health of Ukraine No. 555 as of 27.06.2013 [14].

The obtained results were processed with standard methods of assessment of variational series. The difference between the comparative values was considered reliable at $p < 0.05$. Calculations were performed using the software «Statistica 6.1» («Stat Soft», USA).

3. Results and Discussion

The obtained results showed that 24 (40.0 %) out of 60 patients had the high level of adherence to inhalation therapy, 15 (25.0 %) patients – medium adherence, i.e., were in the risk group of non-adherence, and 21 (35.0 %) – the low level of adherence. The level of adherence was significantly dependent on the regularity of patient's contact with the physician ($r = 0.489$, $p < 0.001$). Relationship between the patient's gender and adherence to drug therapy was not found ($r = - 0.115$, $p > 0.05$).

When analyzing the answers to the first and eighth questions of MMAS-8, the attention was attracted by the fact that almost 50 % of patients at least sometimes forgot to take medications, missed the intake, and at the same time one can assume that more than half of patients never forgot to take them (Table 1). Most likely, they either did not understand the question, or tried to look better in the eyes of the doctor. Correlation analysis showed no relationship between age and the fact that patients forgot to take medications ($r = 0.129$, $p > 0.05$). The latter is most likely due to the fact that the vast majority of patients with COPD were of quite venerable age (50 and older).

Table 1: Answers of COPD patients (n = 60) to MMAS-8 questionnaire

No.	Questions	Number of patients with scored points (abs. / %)	
		0 points	1 point
1.	Do you sometimes forget to take your pills? (Yes - 0 point, No – 1 point)	27 (45,0 %)	33 (55,0 %)
2.	People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine? (Yes - 0 point, No – 1 point)	19 (31,7 %)	41 (68,3 %)
3.	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it? (Yes - 0 point, No – 1 point)	7 (11,7 %)	53 (88,3 %)
4.	When you travel or leave home, do you sometimes forget to bring along your medicine? (Yes - 0 point, No – 1 point)	9 (15,0 %)	51 (85,0 %)
5.	Did you take all your medicine yesterday? (Yes - 1 point, No – 0 point)	9 (15,0 %)	51 (85,0 %)
6.	When you feel like your symptoms are under control, do you sometimes stop taking your medicine? (Yes - 0 point, No – 1 point)	15 (25,0 %)	45 (75,0 %)
7.	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan? (Yes - 0 point, No – 1 point)	10 (16,7 %)	50 (83,3 %)
8.	How often do you have difficulty remembering to take all your medicine? (Never/rarely – 1 point; Once in a while – 0 point; Sometimes – 0 poin; Usually – 0 point; All the time – 0 point)	29 (48,3 %)	31 (51,7 %)

Analysis of patients' responses to the second question showed that every third person missed taking medication for other reasons besides forgetfulness (Table 1). Clarification during the individual interview indicated that 13 (68.4 %) of respondents had some financial difficulties, 4 (21.1 %) patients – doubts about the correctness of prescribed therapy, and 2 (10.5 %) were afraid of side effects of drugs.

15 (25.0%) patients consciously missed the medication intake when they felt well (Table 1). Individual analysis showed that 3 (20.0 %) patients had bronchial obstruction of I degree (FEV_1 (91.5 ± 3.0) % of pred.), 5 (33.3 %) patients – bronchial obstruction of II degree (FEV_1 (66.3 ± 5.4) %

pred.), 6 (40.0 %) patients– bronchial obstruction of III degree (FEV_1 (41.3 ± 2.3) % pred.) and only 1 (6.7 %) patient – bronchial obstruction of IV degree (FEV_1 25.6 % pred.). Correlation analysis between the level of FEV_1 and missed medication intake in patients with COPD because of feeling well revealed the reliable relationship ($r = - 0.238$, $p < 0.05$). The latter indicates that the greater the severity of bronchial obstruction is, the higher becomes the patient's adherence to inhalation therapy.

The data showed that 10 (16.7 %) patients felt hassled about sticking to the treatment plan (Table 1), where 7 (70.0 %) patients were male. Most likely, this is due to the fact that women are more disciplined as to drug therapy, than men.

To the fourth question «When you travel or leave home, do you sometimes forget to bring along your medicine?», 51 (85.0 %) respondents answered negatively (Table 1). During the individual interviews of patients, it was found that the vast majority of them (58 (96.7 %) out of 60 patients) generally do not leave anywhere from the place of residence. In this regard, this question for patients with COPD living in our region cannot be taken into account.

The result of answers to the fifth question of MMAS-8 showed that 51 (85.0 %) patients responded to it positively (Table 1). However, it is possibly due to the physician's reminder of a visit the next day, therefore patients took the inhaled treatment to improve the results of the examination.

The least number of patients (7 (11.7 %) out of 60) independently stopped or reduced the dosage of recommended inhalation therapy, because they felt bad after it's administering (Table 1). Correlation analysis showed the direct reliable relationship between termination or reduction of drug therapy intake and the development of side effects from these medications ($r = 0.385$, $p < 0.001$).

4. Conclusions

1. The level of adherence of COPD patients depends on the regularity of contact with the doctor and does not depend on gender.
2. The main cause of non-adherence of COPD patients is the fact that sometimes patients forget to take medication, among other reasons there are major financial difficulties.
3. The risk group as to the reduced adherence to inhalation therapy includes patients with vague bronchial obstruction.
4. Given the difficulty of obtaining adequate responses to some questions of MMAS-8, one should consider the necessity of developing a new questionnaire for these patients.

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