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The Effectiveness of Some Chronic Pulmonary Management Units for Patients with COPD and Asthma in Vietnam

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ABSTRACT

Introduction: Asthma and chronic obstructive pulmonary diseases are chronic diseases and have high mortality rates in Vietnam and other countries. The chronic pulmonary disease Management Unit is a management model connecting inpatient and outpatient treatment for asthma and COPD patients. Patients receive long-term management and full consultation to share experiences and be provided with necessary information about the disease. The main purpose was to evaluate the effectiveness of the unit for patients with COPD and asthma in Vietnam.

Material and Methods: A Combined cross-sectional study and retrospective longitudinal study were conducted on 310 COPD and asthma patients at Hai Duong, Bac Giang, Thai Nguyen. The questionnaires included 30 questions with two sections including sociodemographic data and using management and treatment services.

Results: After 24 months of management and treatment, knowledge of the disease, medicine use, symptoms, range of activities, eating, sleeping status, and disease control of patients were improved better. For ACT score, the points increased by 2.1 points, 3.4 points, and 4 points, respectively. For the CAT score, the point reduced by 3.7 points, 6.4 points, and 9.1 points, respectively. Improved severe breathlessness efficiency index from 0.6% at 6 months to 9.5% after 24 months.

Conclusion: Our findings suggest that the government needs to invest in facilities, equipment, and human resources to maintain and replicate the model nationwide to help patients receive timely management and treatment, contributing to reducing treatment costs and improving the quality of life for asthma and COPD patients.

INTRODUCTION

Asthma is a major noncommunicable disease (NCD) affecting both children and adults and is the most common chronic disease among children [1]. Inhaled medication can control asthma symptoms and allow people with asthma to lead a normal, active life [2]. There are marked variations in its prevalence between countries, and it is generally more common in developed countries. However, it is increasing in frequency in underdeveloped countries. The aim of asthma management is disease control. International and national guidelines on asthma management stress that inhaled drugs are the mainstay of treatment [3,4].

Chronic obstructive pulmonary disease (COPD) is a common lung disease causing restricted airflow and breathing problems [5]. In low-middle-income countries, household air pollution is a significant risk factor for COPD, accounting for 30–40% of cases [6]. The two main contributing factors to COPD are smoking and air pollution. Although COPD cannot be cured, symptoms can lessen if a person stops smoking, protects themselves from air pollution, and receives vaccinations to fend off infections. Medications, oxygen, and pulmonary rehabilitation are further treatment options [7].

In Vietnam, according to data from a national study conducted between 2006 and 2009, the prevalence of COPD was 4.2% in adults under 40 and 9.2% in people over 65 [8]. According to the study by Ha et al., asthma, COPD, and ACO had respective prevalences of 26, 42, and 32% (18% "like" asthma, 14% "like" COPD) [9]. The practice of control of asthma and COPD in Vietnam is still limited. The main reason for the low control of asthma and COPD are that medical facilities are currently only interested in acute treatment, consultation, and long-term management are not focused on [10]. Therefore, this study aimed to evaluate the effectiveness of some chronic pulmonary management units (CMUs) for patients with COPD and asthma in Vietnam.

MATERIAL AND METHODS

Participants

All asthma and COPD patients and their medical records managed at 3 CMUs in Hai Duong, Bac Giang, and Thai Nguyen provinces from January 2015 to December 2016 were included in the study.

Sample Size and Technique

The sample size was calculated using the formula to calculate the sample size for the cross-sectional survey (step 1) and the sample calculation formula to compare two ratios (step 2). 310 asthma and COPD patients at 3 CMUs were recruited in the present study with a confidence level of 95% and a 5% margin of error. All asthma and COPD patients and their medical records that met the criteria were selected for the study.

Variables of Study

The efficiency index is shown by improvement of symptoms, knowledge, medicine use skills, and disease control after 6 months, 12 months, and 24 months of management and treatment at the CMU. The independent variables were characteristics, ability to access and use services at the CMU, and disease status of asthma and COPD patients.

Questionnaire and Checklist Medical Records

The questionnaire consisted of two sections: The first section was about the sociodemographic variables of patients, including gender, age, occupational, living area, and comorbidities. The second section was about the ability to access and use services at the CMU and the disease status of asthma and COPD patients. The checklist medical records included four sections: (1) symptoms; (2) knowledge about the disease; (3) treatment results; (4) treatment compliance after 6 months, 12 months, and 24 months were managed and

treated at the CMU. Measurement scales were used, including Modified British Medical Research Council (mMRC), COPD Assessment Test (CAT scale), and Asthma Control Test (ACT scale).

The Criteria for Evaluating the Effectiveness of CMU

Each patient was monitored and evaluated at three-time points: after 6 months, after 12 months, and after 24 months of being managed and treated at the CMU. Therefore, the effective evaluation method was to compare the results before and after management and treatment.

Data Management and Analysis

The software Epi data 3.1 was used for data entry. The Statistical Package for Social Sciences (SPSS) version 18.0 was used to analyze the data. For qualitative variables, data was presented using frequencies and percentages, and for quantitative variables, means and standard deviations were used. The effectiveness index was used to evaluate the effectiveness of management and treatment at the CMU.

Ethical Considerations

Ethical approval was received from the Ethics Council, Hanoi Medical University. All participants were explained about the purpose and content of the study. Participation in the study was completely voluntary, and the questionnaires remained anonymous. All information was kept confidential and for research purposes only.

RESULTS

The Sociodemographic Characteristics of Participants

According to Table 1, the average age of the research subjects is 64.4 years old, with the majority being over 60 years old at 60.3%. The average treatment time of the group of subjects was 13.6 months, with the majority of subjects treated within 24 months. 76.8% of study subjects were male. The majority of study participants had less than two co-morbidities, with 78.1%. 67.7% of study participants had COPD, 21.5% had asthma. The majority of study participants smoked and were exposed to dust and chemicals, 69.7% and 62.9%, respectively.

According to Fig.1, when first being managed and treated at the CMU, patients' knowledge of recognizing symptoms of acute exacerbations is relatively low (5.5%). However, after six months of administration, treatment increased to 78.2%; after 12 months, it increased to 89.7%; after 24 months, it increased to 100%. When starting to be managed and treated at the CMU, none of the patients knew how to use

spray/inhalation medications properly. The effectiveness index after 6 months, 12 months, and 24 months is 67.8%, 87.4%, and 98.1%, respectively. When starting to be managed and treated at the CMU, none of the patients knew how to perform respiratory rehabilitation exercises properly. The effectiveness index after 6 months, 12 months, and 24 months is 5.8%, 26.7% and 59.6%, respectively.

According to Table 2, after management and treatment at the CMU, the proportion of patients with symptoms of continuous cough and daily cough gradually decreased, while the proportion of patients with symptoms of occasional cough and no cough gradually increased. The effectiveness indexes were all statistically significant (p<0.05). After 6, 12, and 24 months of management and treatment at the CMU, the proportion of patients with on-site and indoor range of activities gradually decreased, while the proportion of patients with activities outside the home and community increased gradually. The effectiveness indexes were all statistically significant (p<0.05). When starting management and treatment at the CMU, only 5.2% of patients ate well. However, after 6, 12, and 24 months of management and treatment, this rate increased to 67.1%, 93.5%, and 95.2%, respectively. The effectiveness indexes were all statistically significant (p<0.05). When starting management and treatment at the CMU, only 7.7% of patients slept well. However, after 6, 12, and 24 months of management and treatment, this rate increased to 28.1%, 74.2%, and 83.9%, respectively. The effectiveness indexes were all statistically significant (p<0.05).

According to Fig. 2, research results show that the proportion of COPD patients assessed to have mild dyspnea (mMRC level 0-1) and moderate difficulty breathing (mMRC level 2) increased gradually after each period. The proportion of patients assessed to have severe dyspnea (mMRC level 3) and very severe dyspnea (mMRC level 4) decreased over time. These changes were statistically significant (p < 0.05).

According to Fig. 3, the average ACT score also gradually increased compared to before treatment and compared to the time immediately before. This change was statistically significant (p<0.05). The more the ACT score increases, the better the patient's asthma control improves. Moreover, the average CAT score also gradually decreased compared to before treatment and compared to the time immediately before. The difference in average CAT score was statistically significant (p<0.05).

DISCUSSION

Sociodemographic Characteristics of Participants
Age of Participants

The average age of patients with chronic lung disease in Vietnam is 64.4 years old. The age group over 60 accounts for the largest percentage of cases, and the under-40 age group accounts for the lowest percentage of cases. These findings are consistent with previous studies, which have shown that chronic lung disease is rare in young people and more common in middle-aged and older adults [11,12]. This may be due to several factors, including a decline in immune function, cumulative exposure to risk factors such as smoking, and the presence of other medical conditions in older adults. Research on asthma in Vietnam has been limited in the past two decades. According to a study by Ha et al., the prevalence of

Table 1. The Sociodemographic Characteristics of Participants (n=310)

| Sociodemographic Characteristics		Frequency (n)	Percent (%)
Mean Age (min, max, mean)		27; 97; 64.4	
Age Groups (years)	< 40	11	3.5
	40-69	112	36.2
	≥ 60	187	60.3
Treatment Time (min, max, mean)		6 months; 36 months; 13.6 months	
Treatment Time at CMU (months)	Group 1 (6 months)	56	18.1
	Group 2 (12 months)	87	28.1
	Group 3 (24 months)	167	53.8
Gender	Male	238	76.8
	Female	72	23.2
Comorbidities	≤ 2	242	78.1
	> 2	68	21.9
Chronic Pulmonary Condition	Asthma	66	21.5
	COPD	210	67.7
	ACO	34	10.8
Smoking	Yes	216	69.7
	No	94	30.3
Exposure to Smoke, Dust, Chemicals	Yes	195	62.9
	No	115	37.1
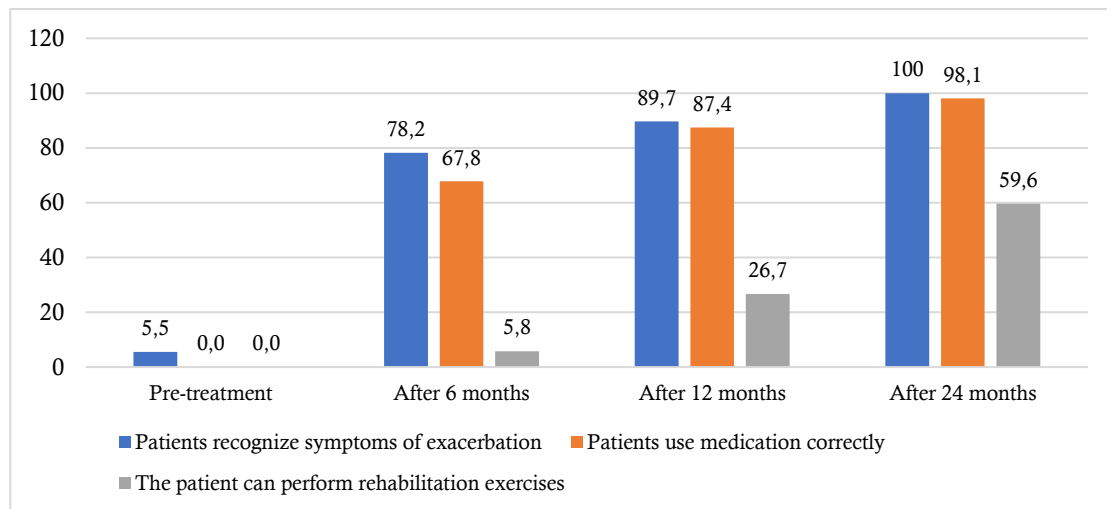
Fig. 1. Changes in Knowledge and Practical Skills of Patients Before and After Management and Treatment at CMU (n=310)

Table 2. Some Symptom Changes in Patients Before and After 6, 12, and 24 Months of Management and Treatment at CMU (n=310)

	Pre-treatment n (%)	After 6 months n (%)	After 12 months n (%)	After 24 months n (%)
Cough				
No	28 (9.0)	36 (11.6)	78 (25.2)	200 (64.5)
Sometimes	48 (15.5)	213 (68.7)	223 (71.9)	102 (32.9)
Everyday	196 (63.2)	61 (19.7)	9 (2.9)	8 (2.6)
Always	38 (12.3)	0	0	0
Activity range				
On-site	10 (3.2)	2 (0.6)	0	0
Indoor	290 (93.5)	76 (24.5)	12 (3.9)	12 (3.9)
Outdoor	10 (3.2)	232 (74.8)	298 (96.1)	235(75.8)
Community	0	0	0	63 (20.3)
Eating condition				
Good	16 (5.2)	208 (67.1)	290 (93.5)	295 (95.2)
Not good	294 (94.8)	102 (32.9)	20 (6.5)	15 (4.8)
Sleep condition				
Good	24 (7.7)	87 (28.1)	230 (74.2)	260 (83.9)
Not good	286 (92.3)	223 (71.9)	80 (25.8)	50 (16.1)

COPD and asthma was 42% and 26%, respectively, with the highest prevalence in patients above 60 for COPD and below 43 for asthma [9].

Gender of Participants

The proportion of patients with chronic obstructive pulmonary disease (COPD) are male higher than female. This result is similar to a WHO report; the prevalence of COPD in the population aged 40 years and older is 7.1% in men and 1.9% in women [5]. Gender also affects asthma differently in terms of time of appearance. The rate of asthma in men is higher than in women until 13-14 years old or over 80 years old [13,14].

Cigarette smoke is a major cause of COPD, both active and passive smoking. Cigarette smoke accounts for 39% of all COPD risk factors [15]. Secondhand smoke increases the risk of COPD four times higher than in non-smokers [16]. In this study, 48.4% of male patients had smoked, while only 5.5% of female patients had smoked. The research group belonged to the Tay, Thai, Cao Lan, and Hoa ethnic groups, which are similar to the Kinh people. However, the proportion of male patients with COPD was still higher than female patients.

Age and gender factors are closely related to smoking factors. The risk of COPD increases with age, possibly due to accumulated exposure to dust and smoke. Men have a higher rate of COPD than women. However, in recent years, the rate of COPD in men and women has become more similar in some developed countries due to a change in smoking status in women [17,18]. Some studies even suggest that women are more sensitive to cigarette smoke than men [19].
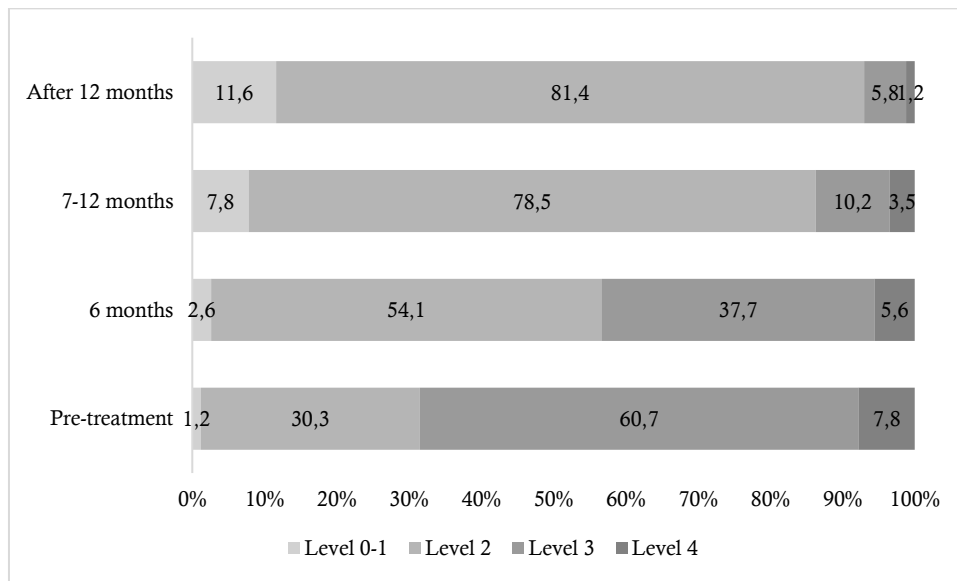
Fig. 2. Change in Difficulty Breathing according to mMRC Before and After Management and Treatment (n=310)

Comorbidity Condition

Recorded when patients begin to be managed and treated at CMUs. Research results show that 100% of patients have comorbidities. 21.9% of patients have two or more comorbid diseases; 78.1% of patients have 1 to 2 types of comorbid diseases. Many studies have shown that having comorbid diseases is a very common phenomenon in COPD patients. One study found that most patients with COPD (97.7%) had at least 1 co-morbidity, and more than half of patients (53.5%) had at least 4 co-morbidities [20]. Determining the incidence and pathological relationship of comorbidities with asthma and COPD is not a simple task because the diseases can have the same risk factors, and have the same symptoms and overlapping conditions, making it difficult to determine cause and effect relationships when analyzing. In our study, comorbidity diagnosis information was obtained based on patient statements and medical records. The results showed that 4/5 common co-morbidities in COPD patients were detected. However, the group of mental co-morbidities (depression, anxiety) has not been found, one of the co-morbidities that has the worst impact on patients' quality of life.

The Results Improved The Disease Condition after Management and Treatment at The CMU

Changes in Patient Knowledge and Skills

Changes in knowledge about the disease and practical skills of patients before and after management and treatment periods at CMUs tended to improve better and were all statistically significant ($p<0.05$). Patients' ability to recognize acute symptoms, using spray/inhalation medicine, and performing rehabilitation exercises increased. This change was similar to some research results on changes in patient knowledge after treatment [21,22].

Using health care services, participating in club activities, and having regular monthly check-ups are conditions for patients to improve their knowledge about the disease and practical skills through receiving information from health workers and studying. Many studies in our country have also shown that club activities associated with outpatient clinic activities have significantly affected support, treatment compliance, improving physical health, and encouraging local people to participate in collective activities confidently and boldly [23,24]. Club activities are one of the important and meaningful activities at CMUs.

Patients with longer management and treatment time at the CMU tend to use more medical services, especially health counseling services, and participate in club activities. Research results show that patients who have had management and treatment time at the CMU for less than 12 months use health care services 0.2 times more than patients with management time at the CMU over 12 months (OR=0.2; 95% CI: 0.1-0.2). These inferences are completely logical and similar to the results of other studies [25].
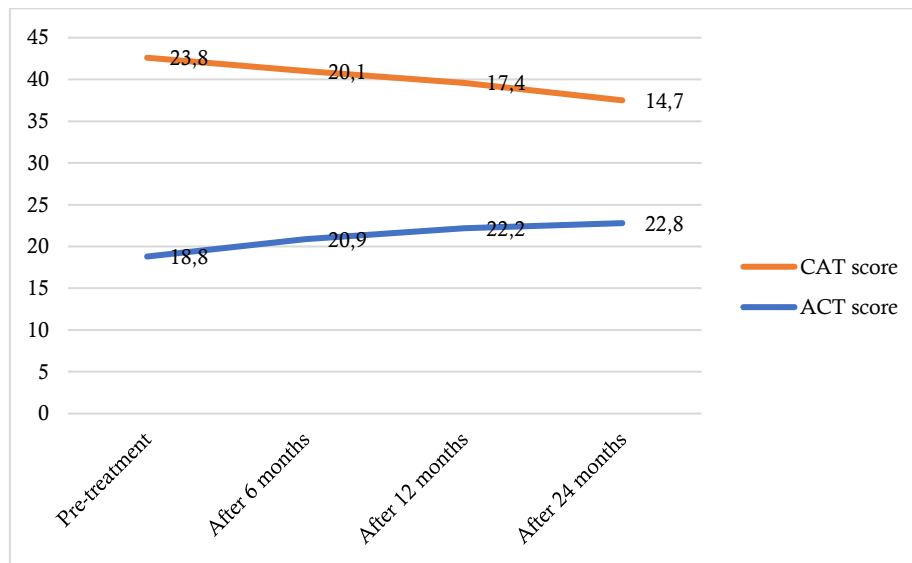
Fig. 3. Average CAT and ACT Score Before and After Management and Treatment (n=310)

Changes in Respiratory Symptoms, Range of Motion, Eating and Sleeping Status

Changes in cough symptoms, cognitive function, range of motion, eating status, and sleeping status of patients before and after management and treatment periods at the CMUs tend to improve better and are statistically significant (p<0.05). Patients at the CMU are mostly elderly people, and their eating and sleeping status has a great impact on the patients' treatment results. Patients' cough symptoms also improved significantly, and the proportion of patients with symptoms of continuous, daily, and occasional cough decreased after 24 months. The results of this study are consistent with the treatment regimen according to the instructions of the Ministry of Health and meet the treatment goals at CMU. Eating, sleeping, and range of motion means the patient's quality of life is improved, which has great significance for each patient, their family, and the community, which reflects the effectiveness of asthma and COPD management and treatment at CMU.

Change in Asthma Control Level According to ACT Score

The average ACT score before treatment was 18.8, increasing to 22.8 after 24 months of management and treatment. The proportion of patients assessed to have good and partial asthma control increased. One the other hand. The rate of patients unable to control asthma decreased by time. The change in ACT score and asthma control level of patients before and after these management and treatment periods were statistically significant (p<0.05).

ACT is used to distinguish different groups in terms of changes in asthma grades according to GINA, FEV1, and PEF values [26]. Research results showed that ACT scores increased after a period of management and treatment at the CMU, meaning that the patient's asthma control level was significantly improved. Therefore, the effectiveness of management and treatment activities, and affirmed the asthma monitoring value of the ACT toolkit.

Studies on asthma management and treatment in Vietnam according to guided regimens with short-term follow-up (usually over 1 year) have shown good treatment effectiveness [27]. According to a study in Can Tho, within 3 months of treatment and evaluation, the average ACT score of asthma patients was 13.1±4.8 at the first visit, which increased to 23.4±1.3 at the 3rd visit (p<0.001) [28]. Thus, it must be recognized that the patient's level of asthma control has improved significantly after a period of management and treatment at the hospital. Therefore, CMUs need to increase the use of ACT to assess disease stability over time, especially in units that do not have the conditions to measure respiratory function. In addition, health workers also need to specifically explain to patients and their families the role, meaning, and instructions on how to use ACT so that they can self-assess their level of asthma control when there are no conditions for follow-up examinations or measure respiratory function.

Change in dyspnea severity according to the mMRC scale and CAT score

The average CAT score decreased with time after treatment. Research results show that the proportion of COPD patients assessed to have mild dyspnea (mMRC level 0-1) and moderate dyspnea (mMRC level 2) increased after 24 months. On the other hand, severe dyspnea (mMRC level 3) and very severe dyspnea (mMRC level 4) decreased after treatment. The change in CAT score and dyspnea level according to mMRC of COPD patients before and after the management and treatment periods were statistically significant ($p<0.05$).

There have been many indicators to assess the level and prognosis of COPD patients that have been applied clinically: CAT score (COPD assessment test-CAT), CCQ (Clini-cal COPD Questionnaire-CCQ), MRC (Medical Research Council- MRC), St George questionnaire, 6-minute walk test [29,30]. However, these indicators do not comprehensively assess the severity of the disease as well as the prognosis of COPD patients.

Similar to asthma, studies on the management and treatment of COPD in many countries according to guided regimens with short-term follow-up have shown good treatment effectiveness. According to the study of Zhou et al., within just 7 days of treatment and evaluation, the average CAT score of COPD patients was 24.82±7.41, which declined to 17.41±7.35 on the seventh day [31].

Our research results also show that the CAT score decreased after the period of management and treatment at the CMU, meaning that the patient's level of dyspnea, according to mMRC, was significantly improved. This shows the effectiveness of the management and treatment activities of the CMU and confirms the value of monitoring and predicting the COPD status of the CAT and mMRC toolkit. Therefore, CMUs need to increase the use of CAT and mMRC to assess disease stability over time. In addition, health workers also need to give specific instructions to patients and their families about the role, meaning, and how to use CAT and mMRC so that they can self-assess the severity of their COPD when there are no conditions for follow-up examinations or measurements of respiratory function.

CONCLUSION

Research results show that the health status of asthma and COPD patients is significantly improved after a period of management and treatment at the CMU. Specifically, The patients' eating and sleeping status are better, and their symptoms are better. The cough gradually reduces, increases ability and range of motion, and better disease control, so it is necessary to expand the CMU model to ensure accessibility and continuity in the care and management of asthma patients. COPD according to the medical classification model in Vietnam.

CMUs need to continue to strengthen the professional capacity of the medical staff at the unit through activities such as (1) Training in knowledge, and counseling skills and guiding patients to perform exercises about rehabilitation; (2) Regularly using scales to evaluate the level of patient improvement such as ACT, CAT, mMRC scales; (3) Implement solutions to support patient compliance with treatment.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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