

# 가

1, 2, 3  
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## The Effect of Repeated Education using a Computerized Scoring System for the Proper Use of Inhalation Medicine

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**Background:** The best way of delivering drugs for the treatment of asthma and chronic obstructive pulmonary disease (COPD) is via the inhaled route of administration. However, many patients use inhaler devices incorrectly. To augment the proper use of inhalation medicine and to improve knowledge of the disease and compliance, we have developed a "Computerized Respiratory Service Program" and applied the use of this program to educate patients.

**Methods:** Prospectively, this study was performed in 164 patients with asthma or COPD prescribed with inhaled medication. When inhalation medication was first prescribed, education using a drug model was conducted two times and thereafter every month. In addition, education using a drug model was conducted and the ability of the patient to use inhalation medicine properly was evaluated.

**Results:** A total of 164 patients participated in the sessions more than two times and received education. Fifty-seven patients participated in three sessions. After the patients received education one time, the ability of these patients to use an inhaler had an average score of 20.6. After the patients received education two times, the average score was 21.9. After the patients received education three times, the average score was 22.3, a further increase. The compliance of using the inhaler was 70.1% at the second session and increased to 81.8% at the third session.

**Conclusion:** Feedback education using the "Computerized Respiratory Service Program" will increase the ability of the patient to use an inhaler and consistent education can maintain patient compliance with inhaler use. (*Tuberc Respir Dis 2007;63:491-496*)

**Key Words:** Chronic obstructive pulmonary disease, Asthma, Inhaler, Computerized respiratory service program

## 서 론

가

(metered-dose inhaler, MDI)

가

10 ~ 86% 50% 14

(dry powder inhaler, DPI) 49 ~

78% 1,2 20 ~

80% 5

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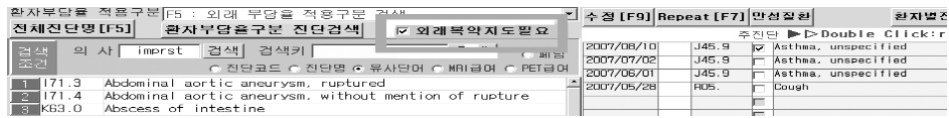


Figure 1. EMR page specialized for an education using an inhaler.



Figure 2. Electric chart for education and evaluation of the patient's using ability of inhaler.

가 6  
(Computerized Re-  
spiratory Service Program, CRSP)

대상 및 방법

1. 대상

164 ( 104 , 60 ) ( , 가  
, )  
43 ,  
가 121 .  
1 (forced expiratory volume at  
1 second, FEV1) 80% ,  
(forced vital capacity, FVC) 1  
(FEV1/FVC)가 70% .

Table 1. Checklist for handling of inhaler

1. Removed cap and shake well (MDI) or cover removed and loading drug (DPI)
2. Hold inhaler upright or at correct angle
3. Tilt head back or keep at level
4. Exhale to FRC or RV before firing
5. Place mouthpieces between lips
6. Release medication (MDI) or inhale forcefully and deeply (DPI)
7. Hold breath for 5-10 seconds
8. Breath out through nose
9. Wait before repeating steps for 20-30 seconds

MDI: Metered dose inhaler; DPI: Dry powder inhaler.

1  
15% 가 가 200 ml  
가 , PC20 10  
mg/ml .

2. 전산화 흡입제 상담 서비스 프로그램

가  
(Figure 1).

가  
(Figure 2).

3. 평가 방법

가 Table 1  
9 가 , 3  
(good), 2 (moderate), 1 (poor) 가 .  
1 : 1 ,  
7 , 14



Table 3. Difference of using ability of inhaler between metered dose inhaler and dry powder inhaler

	1st visit (mean±SD)	2nd visit (mean±SD)	3rd visit (mean±SD)
Metered dose inhaler	19.6±3.1	20.7±3.7	21.6±2.6
Dry powder inhaler	21.0±3.0	22.4±3.2	22.4±3.0
p value	0.009	0.004	0.439

SD: Standard deviation,

Table 4. Understanding action mechanism of inhaler medication

	1st Visit	2nd Visit	3rd Visit
Know	32 (19.5%)	42 (25.6%)	21 (38.8%)
Don't know	132 (80.5%)	122 (74.4%)	36 (63.2%)
Total	164 (100%)	164 (100%)	57 (100%)

Table 5. Understanding of the difference between controller and reliever

	1st visit	2nd visit	3rd visit
Know	110 (67.1%)	158 (96.3%)	57 (100%)
Don't know	54 (32.9%)	6 (3.7%)	0 (0%)
Total	164 (100%)	164 (100%)	57 (100%)

Table 6. Compliance of inhaler medication

	2nd visit	3rd visit
Complete medication	108 (70.1%)	45 (81.8%)
Omit (1~2 times/week)	28 (18.2%)	8 (14.5%)
Omit (>3 times/week)	14 (8.6%)	2 (3.7%)
Dont's use	4 (2.6%)	0 (0%)
Total	154 (100%)	55 (100%)

Table 7. Causes of irregular use

Causes	2nd visit	3rd visit
Forgotten	29 (63.0%)	10 (100%)
Not improve symptoms	2 (4.3%)	0 (0%)
Dont's know how to use	4 (8.7%)	0 (0%)
Adverse effects	5 (10.9%)	0 (0%)
Others	6 (13.1%)	0 (0%)
Total	46 (100%)	10 (100%)

1 164 116  
(70.7%), 2 164 129 (78.7%), 3  
57 45 (78.9%)  
가 가 .  
1 164  
32 (19.5%), 2 164 42 (25.6%), 3  
57 21 (38.8%)  
(Table 4), 가  
1 164 110 (67.1%), 2 164  
158 (96.3%) 가 , 3 57  
57 (100%)  
가 가 (Table 5).  
2 154 108 (70.1%),  
3 55 45 (81.8%)  
가 가 , 1~2  
2 28 (18.2%), 3 8  
(14.5%) 가 (Table 6).  
가 2  
, 2  
29 (63%), 3 10 (100%)  
2  
46 4 (8.7%) 3 가  
(Table 7).

고찰

Newman<sup>7</sup>

18.6% , 7.2% 22.8% 가 , 7.2%

가 , 가 7.

6 . 가 , 100

가 가

Molimard

2 가 2가 가 11.

(28.3%) , 가 (28.9%) (65 )

van Beerendonk<sup>8</sup>

88.9% 20~80%

가 가 5.

가 , 가 가

가 ' ; ' 가 1 가 (67.1%) 3 100%

' ; '10 ' ; ' 가 가 2 154

2 ' ; ' ' ; ' 108 (70.1%) 2

가 2 ' ; ' ' ; ' 3 55 45 (81.8%)

' ; ' ' ; ' 2 3 2 1~2 28

가 1 (18.2%), 3 8 (14.5%)

17.7 , 20.6 , 2 가 3 107 (65%)

19.3 , 21.9 , 3 가 가 1 2 , 2

20.3 , 22.3 가 가 1 2 , 2

3 가 (p<0.05).

Horsley Bailie<sup>9</sup>

6% 46%

가 . Kamps<sup>10</sup> 200 1 57%,

62.5%, 32%

91% , van der Palen<sup>13</sup>

