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Title: The influence of type of inhalation device on adherence of COPD patients to inhaled medication

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Body: Objective: To study the influence of type of inhalation device on adherence of COPD patients to inhaled medication. Methods: Therapy adherence of 795 patients was recorded from pharmacy records over 3 years. It was expressed as percentage and was deemed good at 75–125%, sub-optimal 50-75%, and poor <50% or >125%. Some patients used more than one medication, so we present 1377 medication periods. Results: Patients using a Cyclohaler have a 7-fold increased risk of suboptimal adherence versus good adherence compared to the Handihaler; for Metered Dose Inhaler (MDI) and Diskus 2.3 and 2.2 times as high, respectively. (table 1) Patients using a MDI, Diskus or Autohaler have a 2.0; 2.2 and 6.8-fold increased risk of poor <50% versus good adherence compared to a Handihaler. Patients using a MDI, Autohaler, Turbuhaler or Cyclohaler have an increased risk of poor (>125%) versus good adherence compared to a Handihaler.

Table 1: Nominal regression of device vs therapy adherence. Good adherence and Handihaler are set as reference. Corrected for FEV1 at baseline.

50-75% n=209	Odds	95% CI
FEV1 baseline	1.1	0.8-1.4
1. MDI	2.3	1.5-3.4
2. Diskus	2.2	1.4-3.4
3. Respimat	1.6	0.9-2.9
4. Autohaler	1.0	0.1-8.4
5. Turbuhaler	1.2	0.6-2.3
6. Cyclohaler	7.0	1.9-25.0
<50% n=115		

FEV1 baseline	1.5	1.1-2.1
1	2.0	1.2-3.4
2	2.2	1.3-3.7
3	0.99	0.4-2.3
4	6.8	1.9-24.6
5	1.1	0.5-2.6
6	-	-
>125% n=145		
FEV1 baseline	0.6	0.4-0.9
1	3.5	2.1-6.0
2	1.7	0.9-3.3
3	2.0	0.95-4.3
4	7.0	1.7-29.0
5	7.9	4.3-14.4
6	10.7	2.4-48.1

Conclusions: Handihaler showed the highest adherence. MDI, Autohaler, Turbuhaler and Cyclohaler have a higher risk of overuse compared to Handihaler. MDI, Diskus and Autohaler show an increased risk of underuse.