

Predictors of Good Inhaler Technique in Asthma and COPD.

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The use of inhalers or other devices is dependent on proper technique.

Aim: To evaluate Asthma and COPD patients and determine factors that predict proper inhaler use.

Methods: 167 patients (Male 45%, Mean age 57.6, std 15.3 years) were recruited both from hospital outpatients and from the community. Patients had to be on regular inhalers. 41.3% were under the care of a respiratory physician, 25.7% GP, 19.8% both, and 13.2% none. A questionnaire was filled by the patient followed by direct observation of inhaler technique.

Results: Self-rating of inhaler technique 0-10 mean 7.91, sd 2.06, with 80.1% >=7/10. 67.7% said use of inhaler was easy or very easy, 93.4% said inhalers were effective or very effective. 164 patients used MDIs, of which 119 utilized a spacer. 32(19.5%) used formoterol aerolizer, and 8 (4.8%) used a turbohaler. MDI use was analysed in 12 steps. Mean score was 82.9% (95%CI 80.7-85.1). Paired T test and Mann whitney test comparing with self rating (p=0.45,0.24). Spearman Correlation p=-0.021. Predictors for score >=80%: demo by other health worker OR 4.39 (1.62-11.94,p=0.002), Male Gender 4.13(1.75-9.8 p=0.0001), Influenza vaccine ever 3.7(1.17-11.8, p=0.023), Education level 1-4 1.79(1.15-2.77, p=0.006), number of times explained by doctor 0-4 1.43(1.0-2.47, p=0.048), years of use in decades 1.29(0.98-1.67,p=0.058), self-score 1-10 1.28(1.05-1.56, p=0.012), Use of reliever 0-4 0.74(0.56-0.99, p=0.041), Heart disease 0.25(0.09-0.75, p=0.011).



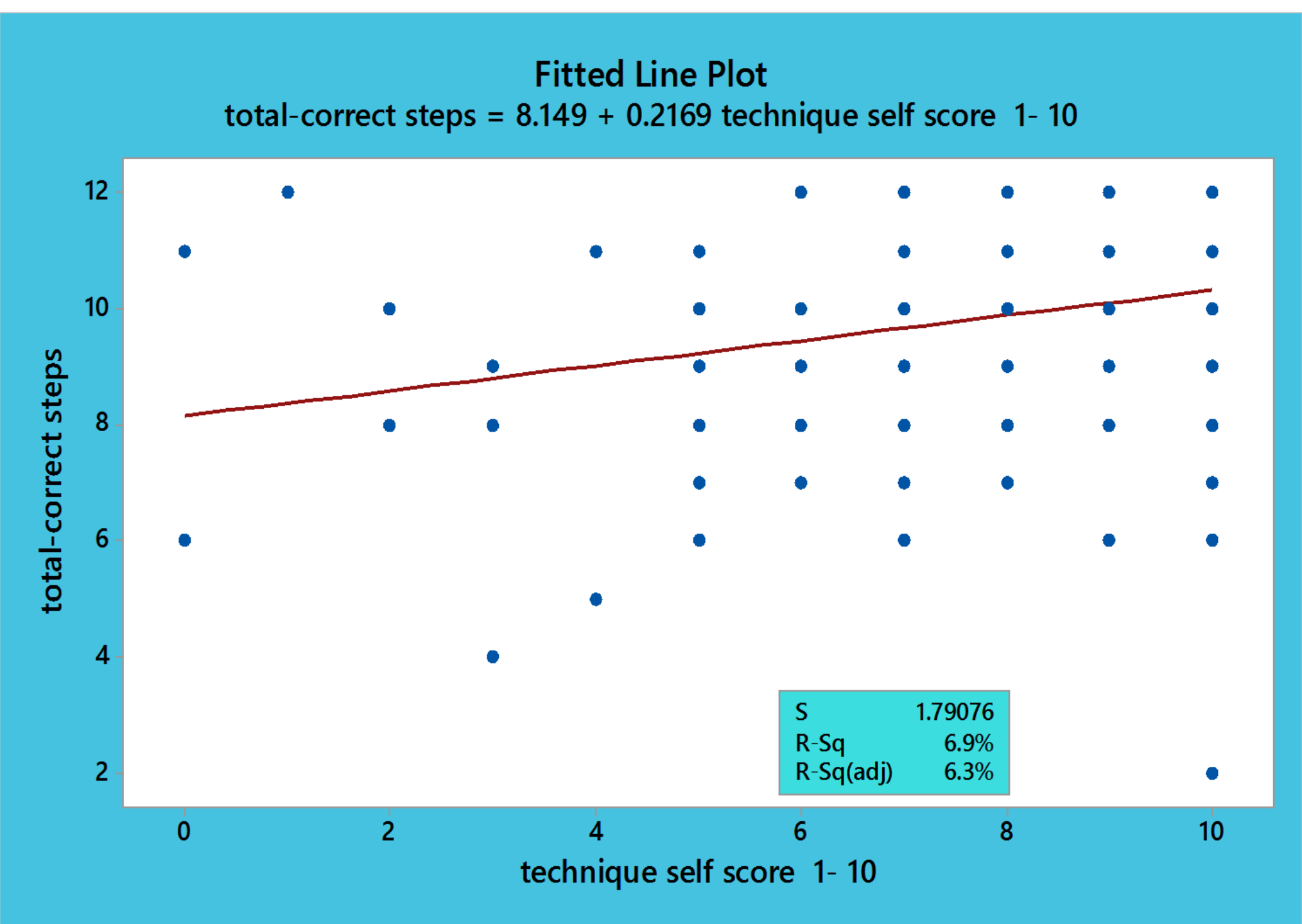
Patient baseline characteristics.

	All	10-12 steps	<10steps
Total	164	108(65.9%)	56(34.1%)
Male	75(45.7%)	56(51.9%)	19(33.9%)
Mean Age (95%CI)	57.9(55.6-60.2)	57.7(55-60.4)	58.3(53.7-62.9)
Asthma	132(80.5%)	91(84.3%)	41(73.2%)
Mean Education	2(1-3)	2.21(2.0-2.4)	1.81(1.67-2.15)
Married	104(63.4%)	73(67.6%)	31(55.4%)
Smoker Y/N	20(12.2%)	11(10.4%)	9(15.5%)
Resp Physician Follow up	100(61%)	67(62%)	33(58.9%)
Resp Physician Explained Y/N	144(87.8%)	95(87.9%)	49(87.5%)
Resp Physician explained times 1-7	3.34(2.9-3.8)	3.55(2.87-4.09)	2.93(2.22-3.64)
Resp Physician Time to explain(1-5)	1.83(1.52-2.06)	1.92(1.63-2.20)	1.68(1.33-2.03)
GP follow up	76(46.3%)	47(43.5%)	29(51.8%)
GP Explained Y/N	83(50.6%)	55(50.9%)	28(50%)
GP explained Times 1-7	1.51(1.15-1.87)	1.43(1.01-1.84)	1.64(0.99-2.29)
GP time to explain(1-5)	1.84(1.62-2.05)	1.01(0.76-1.26)	0.90(0.59-1.20)
Any Follow up	143(87.2%)	94(87%)	49(87.5%)
Other health care professional explained	46(28.1%)	37(34.3%)	9(16.1%)
Info-other source	69(42.1%)	47(43.5%)	22(39.2%)
Use of spacer	97(59.2%)	56(51.9%)	41(73.2%)
Years of inhaler use (decades)	1.96(1.72-2.20)	2.15(1.84-2.45)	1.63(1.22-2.03)
Technique self-score 0-10	7.81(7.46-8.15)	8.13(7.76-8.51)	6.52(7.89)
Perception as Effective 1-4	2.36(2.26-2.47)	2.38(2.25-2.51)	2.33(2.15-2.51)
Concern side effects 0/1	32(19.5%)	21(19.4%)	11(19.6%)
Steriods oral last year	53(32.7)	35(32.4%)	18(32.1%)
Exacerbation(previous year)	81(49.4%)	54(50%)	27(48.2%)
Use of ventolin >3 per week	75(45.7%)	47(43.5%)	28(50%)
Diabetes	26(15.9%)	17(16%)	9(15.5%)
Cholesterol	47(28.7%)	25(23.1%)	21(37.5%)
Hypertension	76(46.3%)	47(43.5%)	29(51.8%)
Heart Disease	24 (14.6%)	11(10.4%)	13(22.4%)
Influenza vaccine (current)	99(60.4%)	64(59.2%)	35(62.5%)
Pneumococcal vaccine	28(17.1%)	23(21.3%)	5(8.9%)

Steps for correct inhaler technique.

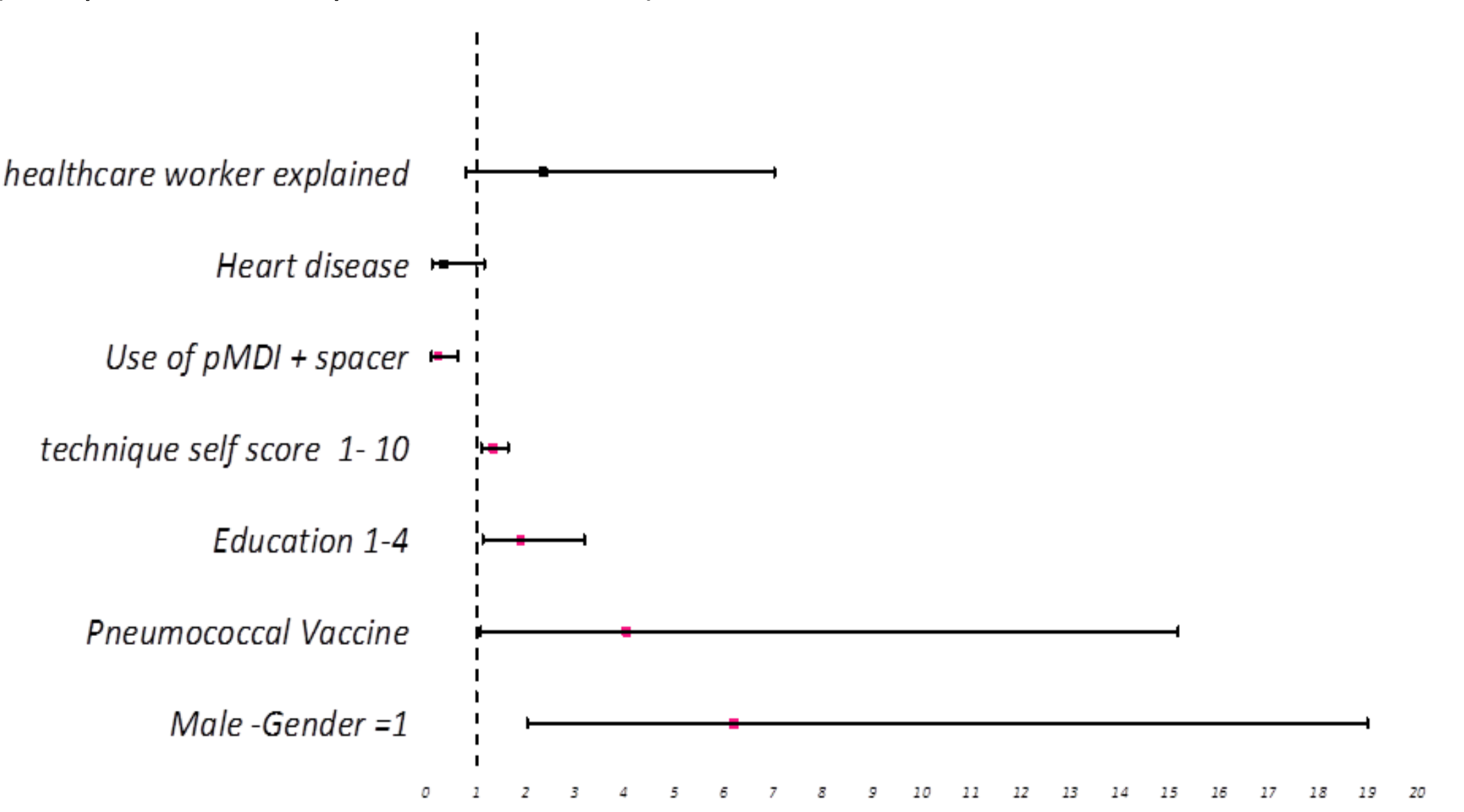
Step	pMDI + Spacer	pMDI
1	Remove the cap from the inhaler.	Remove the cap from the inhaler.
2	Shake the inhaler well for 5 seconds.	Shake the inhaler well for 5 seconds.
3	Insert the inhaler into the open end of the chamber and ensure that the inhaler fits properly.	Hold the inhaler firmly by placing your index finger on top of the canister, and thumb on the bottom of the mouthpiece.
4	Sit up straight or stand up.	Sit up straight or stand up.
5	Tilt your head back slightly.	Tilt your head back slightly.
6	Exhale completely away from the spacer.	Exhale completely away from the inhaler.
7	Place the mouth piece in your mouth and seal your lips tightly around it.	Place the inhaler in your mouth and seal your lips tightly around it.
8	Press the inhaler and breathe in steadily and deeply.	Press the inhaler and breathe in steadily and deeply.
9	Remove spacer from the mouth.	Remove the inhaler from the mouth.
10	Hold your breath for 10 seconds or as long as is comfortable.	Hold your breath for 10 seconds or as long as is comfortable.
11	Exhale slowly.	Exhale slowly.
12	Remove the inhaler from the chamber and replace covers.	Replace cap on inhaler.

Critical steps are shown in bold red.

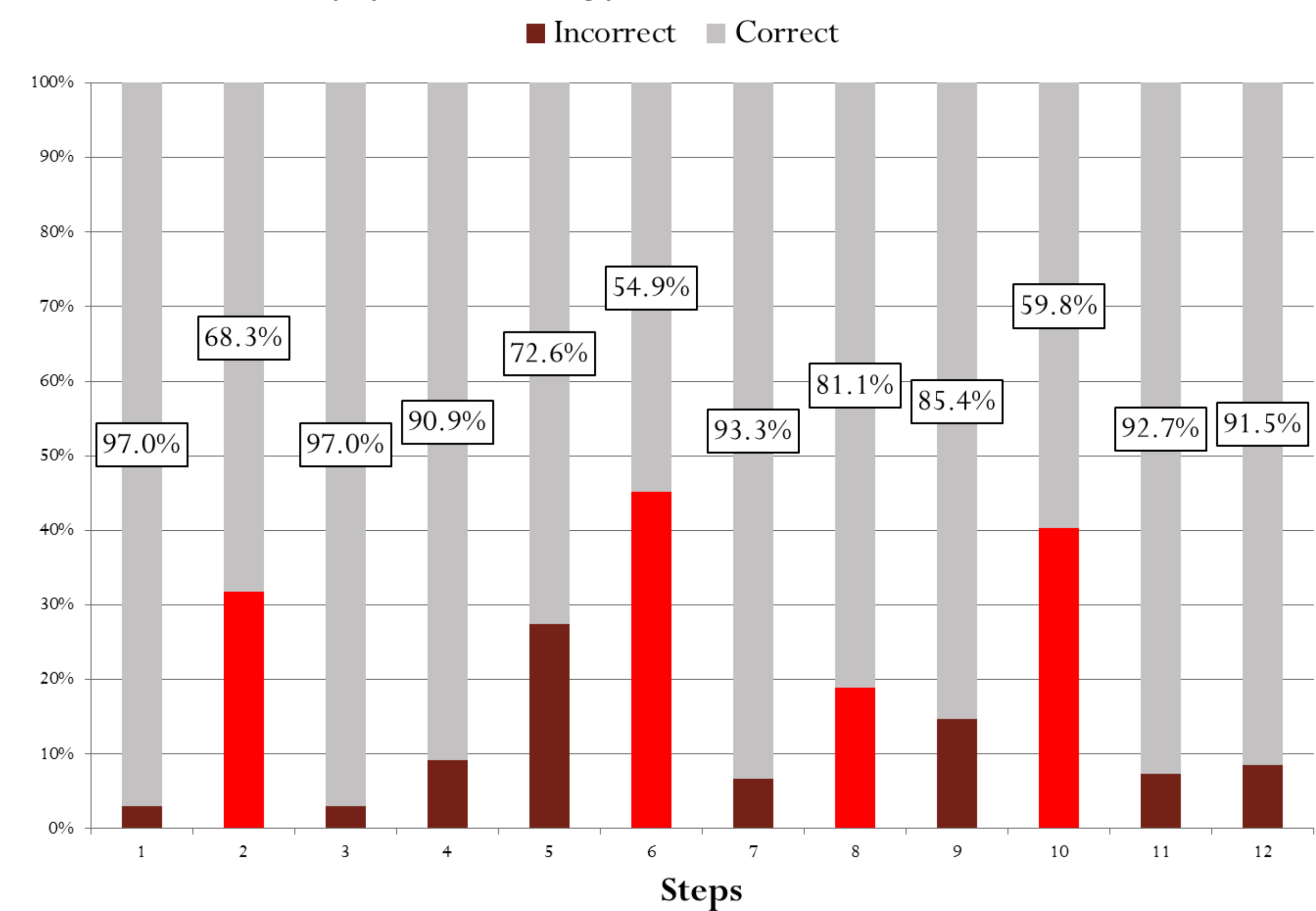


Predictors of PMDI inhaler technique.

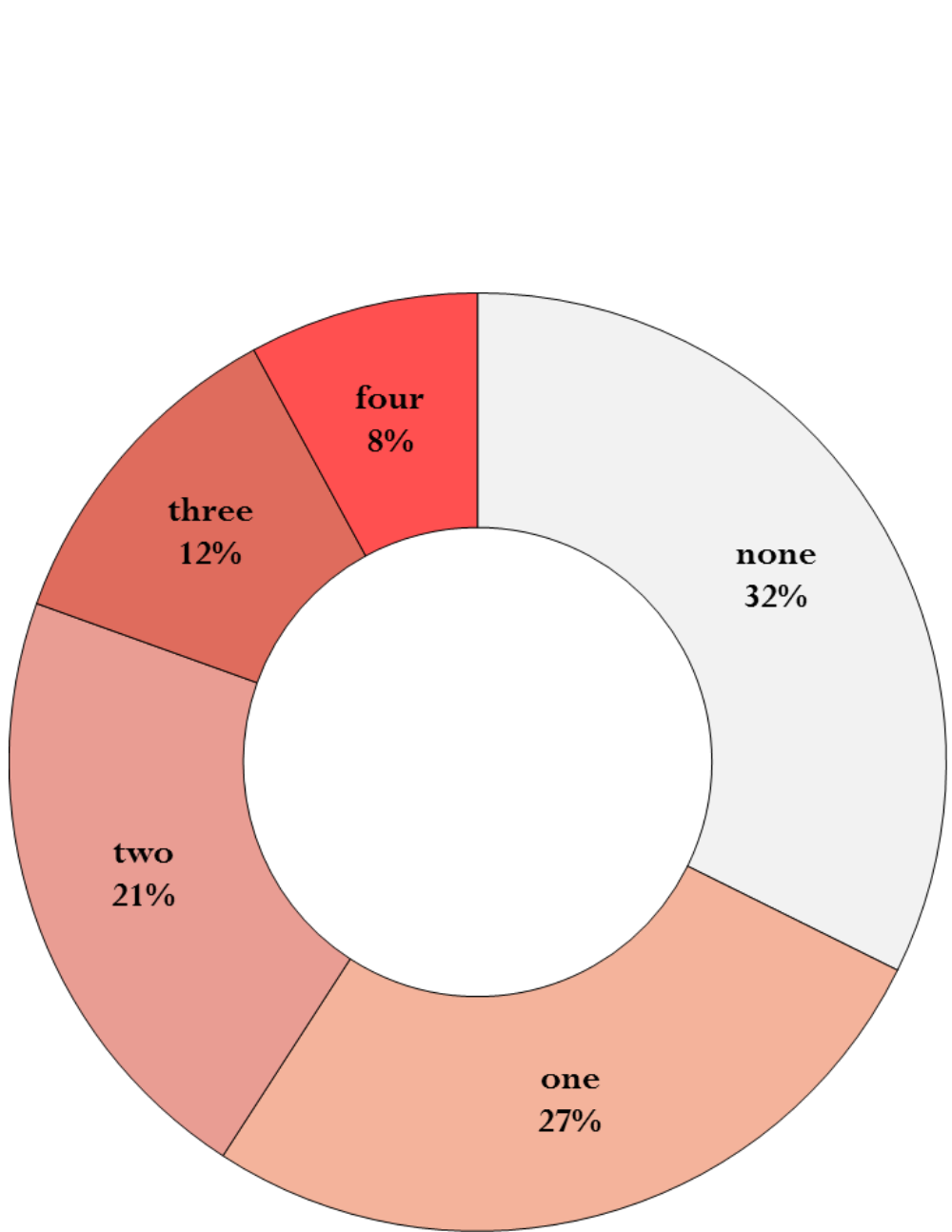
(Red p<0.05, black p>0.05 and <0.15)



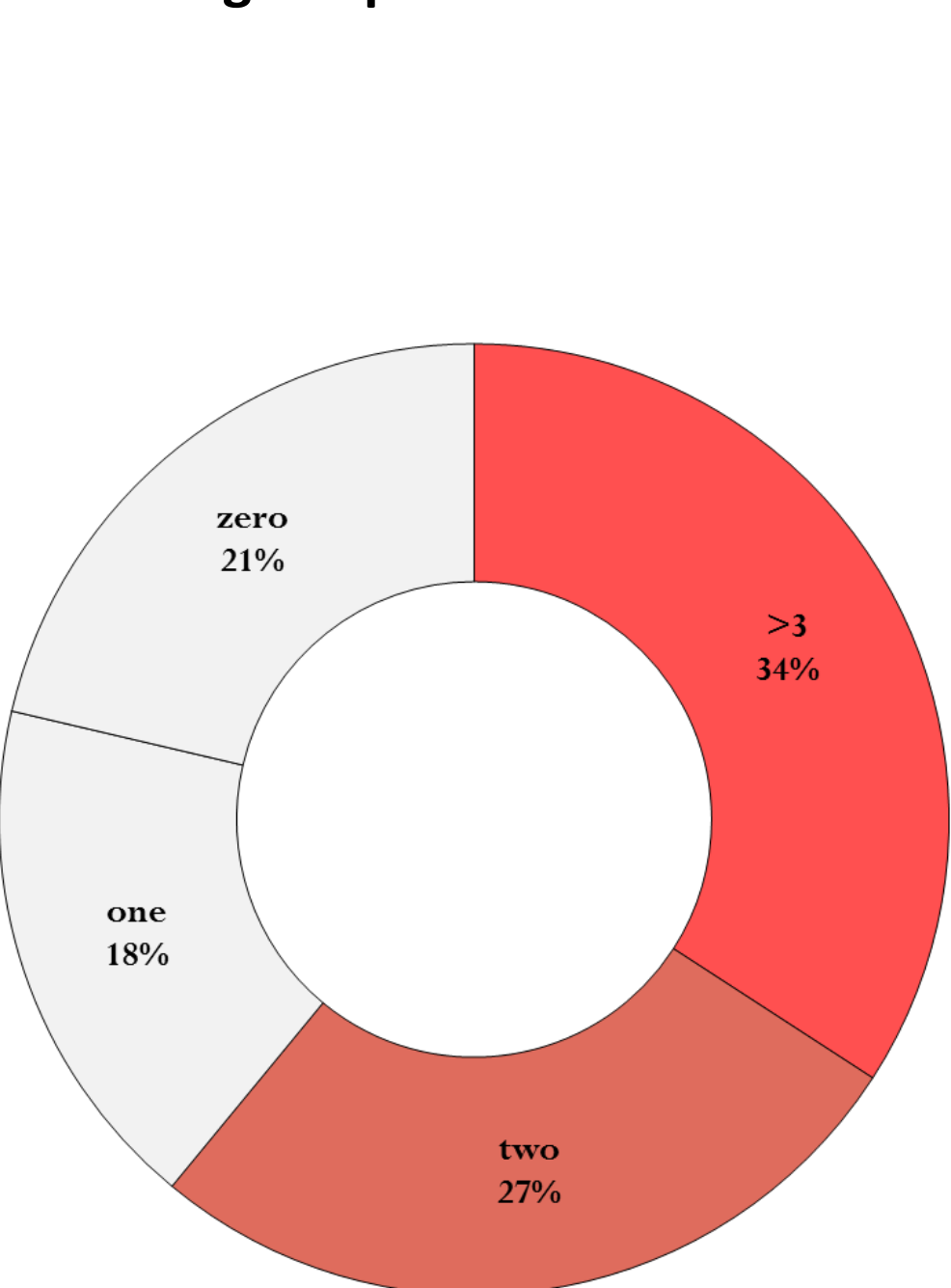
Correct and incorrect steps performed using pMDI.



Percentage of patients by number of critical errors.



Percentage of patients with errors in technique.



Conclusion:

Patients' self-rating, repeated physician demos, health professional demos, longer duration of use, education level, male gender and lower reliever use predicted good inhaler technique.

66% of patients obtained a score of 10/12 or more in their inhaler technique.

The four steps of inhaler technique which were most mistaken were: Step 2—shaking the inhaler well for 5 seconds, Step 5—tilt your head back slightly, Step 6—exhale completely away from the inhaler and Step 10—hold your breath for ten seconds or as long as is comfortable.

Male gender was found to be a positive predictor of good inhaler technique, most likely due to better hand to eye co-ordination.