DO LONGITUDINAL MEASURES OF CLINICAL VARIATION CORRELATE WITH ADHERENCE IN CYSTIC FIBROSIS

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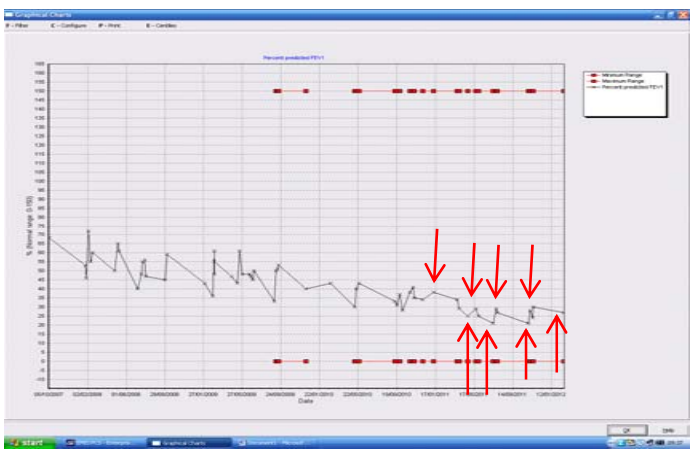
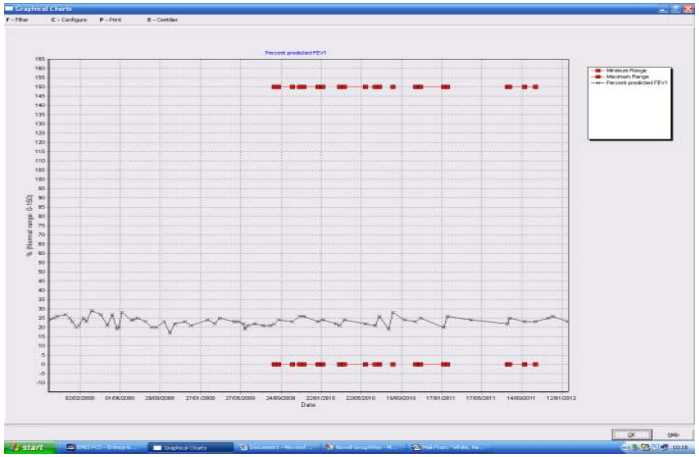
Introduction: An electronic clinical record (ECR) coding for all variables of CF and capturing ‘real time’ data from 2007 onwards was used as a basis for this study. From this data, longitudinal patterns of clinical variation have emerged that suggest a relationship between variation in lung function and adherence (Fig 1), where patterns of rapid improvements and decline could indicate poorer adherence to treatments when compared to a less variable picture. Adherence is difficult to measure with accuracy, prompting us to explore objective indicators that might aid early identification of patients who have difficulty in taking prescribed medications

Fig 1 Longitudinal variation in lung function as shown on electronic clinical record





The aim of the study was twofold

a) To determine the accuracy of self-report adherence and its relationship with clinical variation

b) To explore whether objective measures, including clinical variation can predict adherence.

Methods: Patients aged 16 years and over attending an adult regional CF centre (total population n=420 patients) were invited to complete an adherence questionnaire (CFQ-R) and consent to pharmacy script data collection (previous 6 months). Coefficient of variation for FEV_1 (CoV FEV_1) was calculated from all contacts within the previous year.

- The coefficient of variation (CV) was defined as the ratio of the standard deviation to the mean [CV = SD/mean]
- We used data for 1 year prior to study enrolment using the highest and lowest values in trends over that 1 year period calculating mean and SD of these collated values for FEV1, Weight and CRP(See Figure)

Age, gender, microbiology, disease severity (banding status), medication, lung function and weight were noted at baseline. Self-reported adherence was calculated against prescribed medication (using ECR) and patients classified into one of 3 categories: low (<60%), moderate (60-80%), good (>80%) according to % calculated adherence. Ordinal regression was used to determine the contribution of age, gender, microbiology status, disease severity (Banding status), medication, genotype and CoV FEV_1 to self-reported adherence.

Results: Patients (n=250) [age 29.7(±9.2) yrs, 58.6% (M), baseline BMI 22.5 kg/m^2 (±3.8), FEV_1 61.3% (±25.1), FVC 79.4% (±23.1)] completed the study. Pharmacy collection data was available for 106 (42%) patients. Pharmacy script collection was strongly correlated to self-reported adherence (Table 1). CoV FEV_1 was inversely related to self-reported adherence (Table 1, Fig 2). Conversely as adherence category improved, patients were noted to take greater numbers of medications. Regression analysis revealed that adjusting for disease severity CoV FEV_1 [OR = 0. 95; CI: 0.92 to 0.99, p=0.016], number of types of medication [OR =

1.2; CI: 1.1to 1.3, p<0.001], and age [OR = 1.04; CI: 1.01 to 1.07, p=0.01] together explained 24% of the variance in the model. Genotype, gender, microbiological status, were not individual predictors of adherence, nor did they contribute to the final model.

Conclusion: Self-report adherence consistently exceeds medication collection by an average of 14%. Coefficient variation of FEV_1 may be an indirect measure of adherence and contributed to the final adherence model. In contrast to other studies medication load was greater as adherence category improved. Accurate longitudinal measures captured in 'real time' can aid in examining adherence and warrant further investigation.

Figure 1

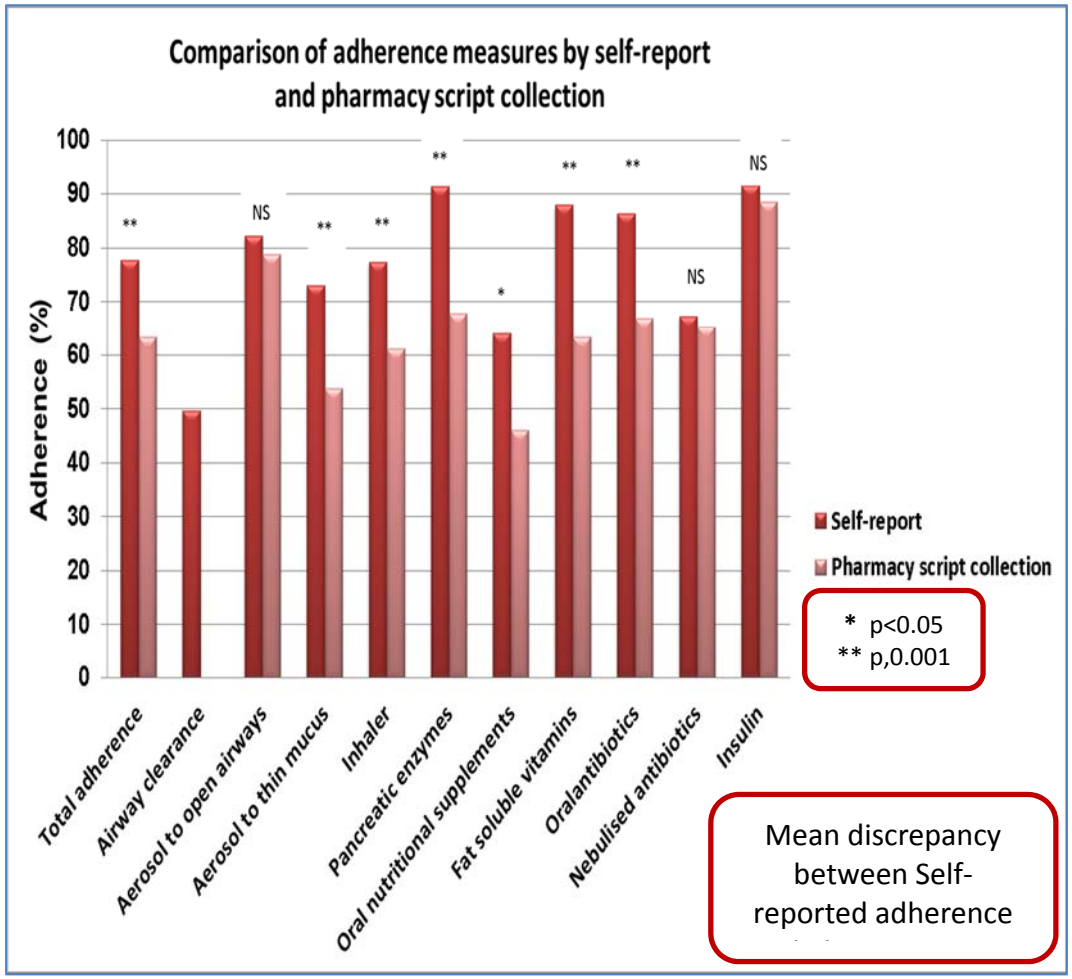
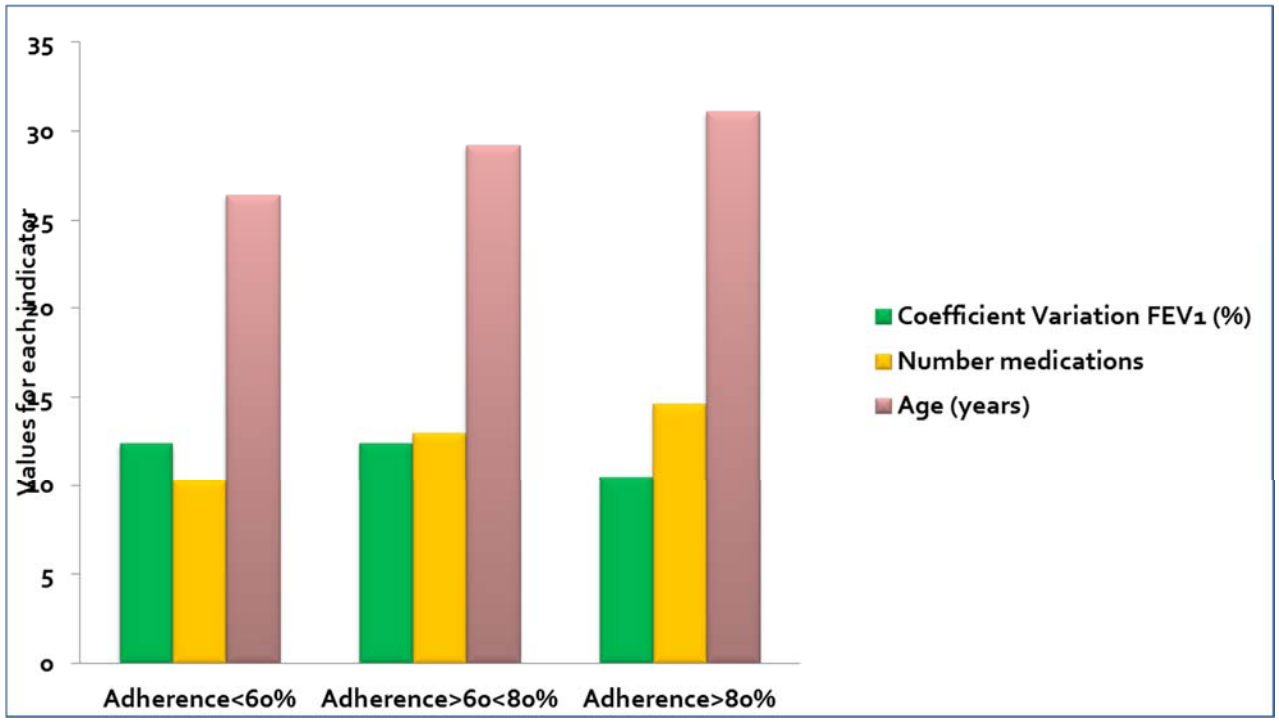


Table 1		Correlations with self-report adherence				Descriptive statistics	
	Adherence Self-Report (using CFQ-R) (%)	Pharmacy script collection	Sig	Coefficient variation FEV_1	Sig	Pharmacy script discrepancy (%)	Sig
Total adherence	77.7(±17.5)	0.61	P<0.001	-0.16	P<0.001	-14.3	p<0.001
Aerosol to open airway	82.3(±31.9)	0.34	P<0.005	0.001	p=0.47	-4.5	p=0.24
Aerosol to thin mucus	73.0(±37.8)	0.51	p<0.001	-0.11	p=0.06	-19.2	p<0.001
Inhaler	77.4(±35.4)	0.51	p<0.001	-0.07	p=0.21	-16.2	p<0.001
PERT	91.4(±21.3)	0.45	p<0.001	-0.21	P=0.001	-23.6	p<0.001
Oral nutrition supplements	64.1(±39.8)	0.51	p<0.001	-0.20	P=0.01	-18.1	p<0.01
Vitamins	88.2(±27.2)	0.46	p<0.001	-0.03	P=0.35	-24.7	p<0.001
Oral antibiotics	86.4(±26.6)	0.32	p<0.001	-0.15	P=0.01	-19.5	p<0.001
Nebulised antibiotics	67.4(±9.1)	0.55	p<0.001	-0.19	P=0.01	-2.1	P=0.43

Figure 2 Changes in the 3 objective predictors of reported adherence within each adherence category



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