Cochrane Database of Systematic Reviews - - Cochrane Review

Digital technology for monitoring adherence to inhaled therapies in people with cystic fibrosis

Code: CD013733 **Year:** 2025 **Date:** 2020 - updated: 9 NOV 2021 **Author:** Calthorpe R

Study design (if review, criteria of inclusion for studies)

randomised controlled trials (RCTs) looking at the effects of a digital technology for monitoring adherence of children and adults with CF to inhaled therapies

Participants

Patients with CF

Interventions

Digital technology

Outcome measures

Adherence to inhaled therapies and health status

Main results

We included two studies with 628 participants aged five to 41 years. There was one study in each of two different comparisons. Nebuliser target inhalation mode versus standard inhalation mode - One parallel study was carried out over 10 weeks after a runâ€•in period of four to six weeks. The study compared the effects of a digitally enhanced inhalation mode (target inhalation mode) for nebulised antibiotics compared to standard mode in children attending a regional CF clinic in the UK. The primary outcome was the time taken to complete the inhaled treatment, but the study authors also reported on adherence to therapy. The results showed that adherence may improve when using the target inhalation mode (mean difference (MD) 24.0%, 95% confidence interval (CI) 2.95 to 45.05; 1 study, 20 participants; lowâ€•certainty evidence). The target inhalation mode may make little or no difference to FEV1 % predicted (MD 1.00%, 95% CI âˆ’9.37 to 11.37; 1 study, 20 participants; lowâ€•certainty evidence). The study did not report on treatment burden, QoL or pulmonary exacerbations. We downgraded the certainty of the evidence for imprecision due to the small sample size, and for indirectness as the study was carried out in children and the results may not be applicable to adults. eNebuliser with digital support versus eNebuliser without support - One large multicentre RCT monitored adherence via dataâ€•tracking nebulisers for 12 months. The intervention group also received access to an online webâ€•based platform, CFHealthHub, which offered tailored, flexible support from the study authors as well as access to their adherence data, educational and problemâ€•solving information. Compared to usual care, the digital intervention probably improves adherence to inhaled therapy (MD 18%, 95% CI 12.90 to 23.10; 1 study, 588 participants; moderateâ€•certainty evidence); probably leads to slightly reduced treatment burden (MD 5.10, 95% CI 1.79 to 8.41; 1 study, 539 participants; moderateâ€•certainty evidence); and may lead to slightly improved FEV1 % predicted (MD 3.70%, 95% CI âˆ’0.23 to 7.63; 1 study, 556 participants; lowâ€•certainty evidence). There is probably little or no difference in the incidence of pulmonary exacerbations or QoL between the two groups. We downgraded the certainty of the evidence for indirectness as the intervention was only assessed in an adult population and therefore may not apply to children.

Authors' conclusions

Digital monitoring plus tailored support via an online platform probably improves adherence to inhaled therapies and reduces treatment burden (but without a corresponding change in QoL) in the medium term (lowâ€• and moderateâ€•certainty evidence). In a shorter timeframe, technological enhancement of inhaling antibiotics may improve adherence to treatment (lowâ€•certainty evidence). There may be little or no effect on lung function with either intervention, and online monitoring probably makes no difference to pulmonary exacerbations. Future research should assess the effect of digital technology on adherence to inhaled therapies in both children and adults. Consideration of adherence to the total treatment regimen is also important, as improved adherence to inhaled therapies could come at the cost of adherence to other parts of the treatment regimen.

https://doi.org//10.1002/14651858.CD013733.pub3

See also

Calthorpe R, Smith S, Jahnke N, Smyth AR. Digital technology for monitoring adherence to inhaled therapies in people with cystic

fibrosis. Cochrane Database of Systematic Reviews 2025, Issue 12. Art. No.: CD013733. DOI: 10.1002/14651858.CD013733.pub3. Accessed 20 December 2025.

Keywords

Adolescent; Adult; information; non pharmacological intervention - psyco-soc-edu-org; Self-Management; Psychoeducation; Behavioural interventions;