Adherence to medication in paediatric asthma

Paediatric Non-Medical Prescribing Study Day

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Outline of the talk

Today we aim to understand:

1. What adherence is and the context of adherence behaviour
2. Why it is important to measure adherence and a useful theoretical model of behaviour
3. Specific barriers and enablers for adherence in pediatric asthma
4. Take home messages

What is adherence?

‘The extent to which the patient’s behaviour matches agreed recommendations from the prescriber’ (Barofsky, 1978)

- Barofsky, I. 1978. `Compliance, adherence and therapeutic alliance: Steps in the development of self-care’, Social Science and Medicine 12(5A:, 369-376

Three Phases of Adherence

(i) Uptake

Prescription given and the decision is made whether to take collect the prescription/ equipment needed

(ii) Implementation

Starting the medication/ treatment

(iii) Persistence/ Discontinuation

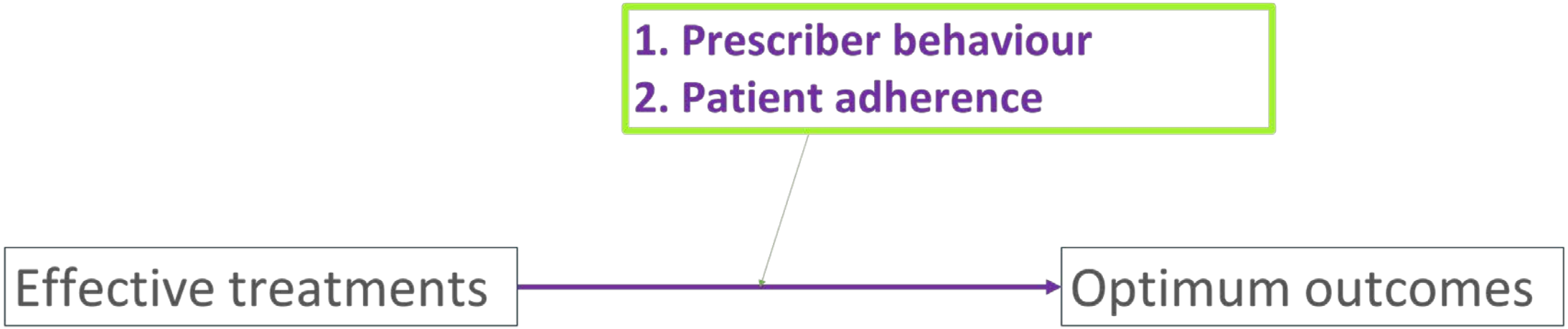
Continuing to take the treatment as prescribed or to stop taking it

- Vrijens B, De Geest S, Hughes DA, et al. (2012) A new taxonomy for describing and defining adherence to medications. Br J Clin Pharmacol. , 73, 691-709.

Medicines as an intervention

- The prescription of a medicine is one of the most common interventions in healthcare.
- In England there were 1.18 billion NHS prescriptions dispensed in the community in the year 2022/23, costing £10.4 billion.
- The optimal use of appropriately prescribed medicines is vital to the self-management of most long-term conditions affecting 26 million people in England alone

The gap between prescription and health outcomes



- Sabaté E, editor. Adherence to long-term therapies: evidence for action. Geneva, Switzerland: World Health Organization; 2003.
- Elliot R A, Boyd M J, Salema N et al. (2015) Supporting adherence for people starting a new medication for a long-term condition through community pharmacies: a pragmatic randomised controlled trial of the New Medicine Service BMJ Quality and Safety on-line first doi:10.1136/bmjqs-2015-004400

Prescriber Behaviour

- Research shows that prescribers do not often proactively screen for adherence barriers (before a problem occurs)
- If adherence is checked is can be done on a manner which results in “false” patient response (Engel et al, 2017)
- In fact, doctors only identify non-adherence correctly in patient in under half of cases (Lee et al 2018)
- Lack of ownership of the role of exploring adherence

- Engel T, Ungar B, Ben-Haim G, Levhar N, Eliakim R, Ben-Horin S. (2017) Re-phrasing the question : A simple tool for evaluation of adherence to therapy in patients with inflammatory bowel disease. United European Gastroenterology Journal, 5, 6, 880 – 886
- Lee, J., Tay, T. R., Radhakrishna, N., Hore-Lacy, F., Mackay, A., Hoy, R., . . . Hew, M. (2018). Nonadherence in the era of severe asthma biologics and thermoplasty. Eur Respir J, 51(4). doi:10.1183/13993003.01836-2017

Non-Adherence in Pediatric Asthma

- Although asthma is often manageable by preventer medicines, such as inhaled corticosteroids (ICS)
- Nonadherence has been found to be an issue in over 50% of children and contributes to poor control and child asthma deaths still occur regularly (Williams et al., 2011; Engelkes et al., 2015)
- Nonadherence, defined as less than 80% of prescribed ICS dose (Suissa et al., 2000; Suissa et al.,1994)

- Williams LK, Peterson EL, Wells K, Ahmedani BK, Kumar R, Burchard EG, et al. Quantifying the proportion of severe asthma exacerbations attributable to inhaled corticosteroid nonadherence. J Allergy Clin Immunol. 2011;128(6):1185-91 e2.
- Engelkes M, Janssens HM, de Jongste JC, Sturkenboom MCJM, Verhamme KMC. Medication adherence and the risk of severe asthma exacerbations: a systematic review. European Respiratory Journal. 2015;45(2):396-407
- Suissa, S., Ernst, P., Benayoun, S., Baltzan, M., & Cai, B. (2000). Low-dose inhaled corticosteroids and the prevention of death from asthma. New England Journal of Medicine, 343(5), 332-336. doi:Doi 10.1056/Nejm200008033430504
- Suissa, S., Ernst, P., Boivin, J. F., Horwitz, R. I., Habbick, B., Cockroft, D., . . . Spitzer, W. O. (1994). A cohort analysis of excess mortality in asthma and the use of inhaled beta-agonists. American Journal of Respiratory & Critical Care Medicine, 149(3 Pt 1), 604- 610. doi:10.1164/ajrccm.149.3.8118625

Measurement, Measurement, Measurement

- We need to measure adherence
- Depending on budget and access there are several ways to measure adherence

- There are pros and cons to each tool which myself and Dr Louise Fleming have outlined in a review

- Objective measurements are useful as a starting point to discuss adherence with patients

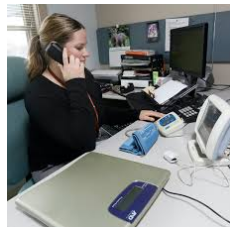
➢ Pearce, C. J., & Fleming, L. (2018). Adherence to medication in children and adolescents with asthma: methods for monitoring and intervention. *Expert Rev Clin Immunol, 14*(12), 1055-1063. doi:10.1080/1744666X.2018.1532290

Measurement, Measurement, Measurement!

- Importantly: We are interested in not just do they or don't they adhere but what the pattern of their adherence is

- Examples tools are validated self-report tools (low budget), prescription collection records (low accuracy in children) electronic monitors attached to inhalers (some are better than others and costly)

- All of these measures can be used remotely to measure adherence
- Many of the EMD have apps



➢ Makhecha S, Chan A, Pearce C.J, Jamalzadeh A and Fleming L. (2020) Novel electronic adherence monitoring devices in children with asthma: a mixed-method study. *British Medical Journal Open Respiratory Research.*7:e000589. doi: 10.1136/bmjresp-2020-000589

Prescription Uptake Rates:
Medication Possession Ratio

Data from prescription issues or pharmacy refills allow calculation of the Medication Possession Ratio (MPR). It is number of doses prescribed (or issued) divided by the number that would be expected in that time scale and expressed as a percentage.

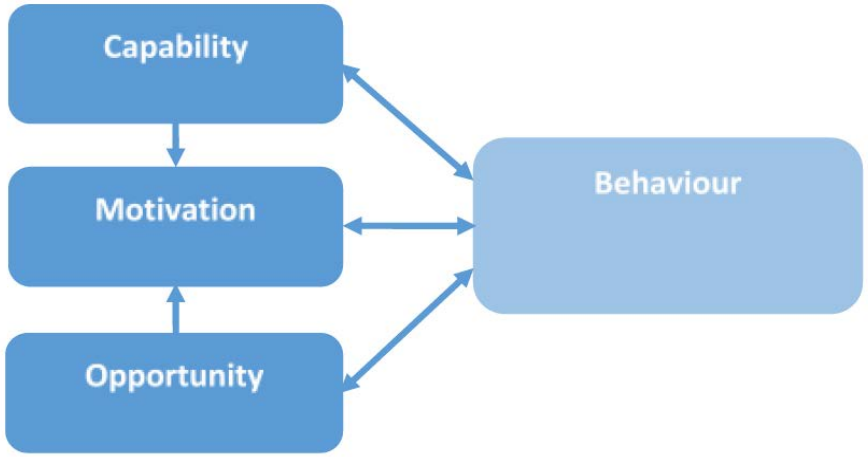
$$\text{MPR}\ (\%) = \frac{\text{Number of doses prescribed (in the interval)}}{\text{Number of doses expected (in the interval)}}\ \text{x}\ 100$$

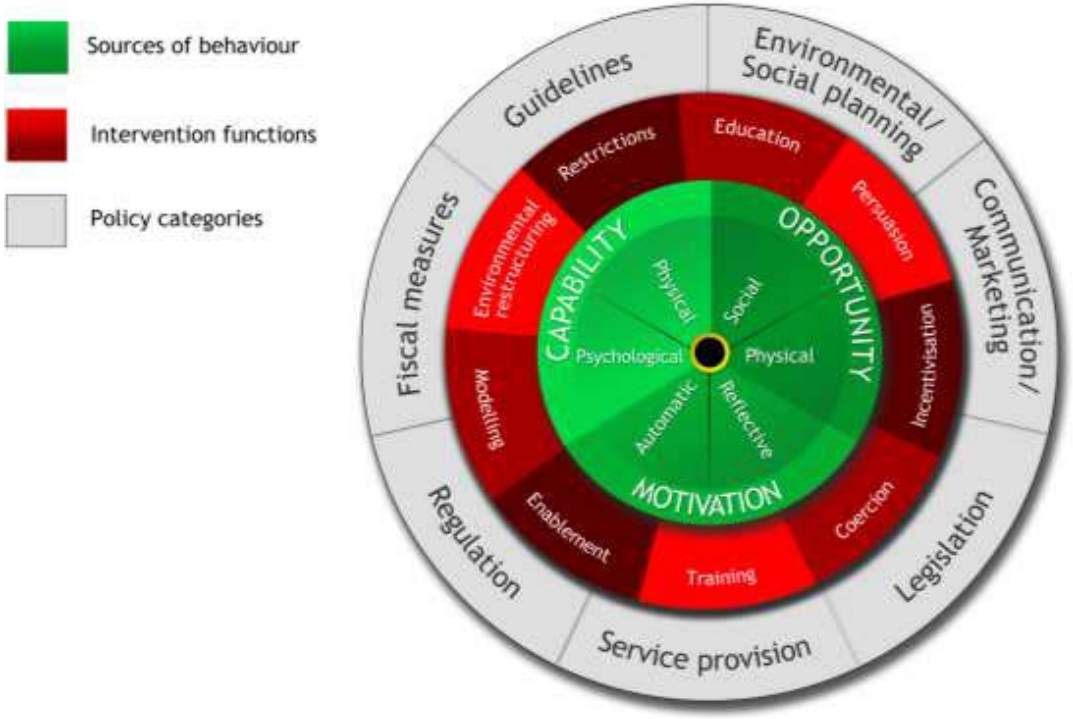
MPR (%)= $\frac{8 \text{ x } 60}{12 \text{ x } 60}$ x 100= 66.66

- Andrade SE, Kahler KH, Frech F, Chan KA. Methods for evaluation of medication adherence and persistence using automated databases. Pharmacoepidemiol Drug Saf. 2006;15:565–74. 32.
- Arnet I, Abraham I, Messerli M, Hersberger KE. A method for calculating adherence to polypharmacy from dispensing data records. Int J Clin Pharm. 2014;36:192–201.
- Patton, D. E., Pearce, C. J., Cartwright, M., Smith, F., Cadogan, C. A., Ryan, C., ... & Hughes, C. M. (2021). A non-randomised pilot study of the Solutions for Medication Adherence Problems (S-MAP) intervention in community pharmacies to support older adults adhere to multiple medications. Pilot and Feasibility Studies, 7, 1-21.

The theory of medication adherence

- Adherence can be either **intentional** or **unintentional**
- Reasons for non-adherence fall into these categories from the COM-B model





➢ Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science, 6*. doi:Artn 42 10.1186/1748-5908-6-42

Motivation:
Beliefs about Medicine

General beliefs: About the type of medicine as a whole

Specific beliefs: About a specific medicine prescribed for a specific illness

- **Necessity beliefs:** about personal need for the treatment to maintain/improve current and future health
- **Concern beliefs:** about potential negative effects of the treatment

- Horne, R. (2003). Treatment perceptions and self-regulation. In *The self-regulation of health and illness behaviour* (pp. 138–153). London: Routledge
- Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. Journal of Psychosomatic Research, 47(6), 555-567.

Beliefs about Medicine in Pediatric Asthma

- Klok and colleagues (2011-2015) explored illness and treatment beliefs in young children
- Yilmaz and colleagues (2012) found that child reported necessity beliefs to be correlated with respiratory clinical severity, and that parental and child concern beliefs were only moderately correlated
- 50% of children aged 11 manage their asthma treatments independently with little or no supervision from their parents (Orrell-Valente, Jarlsberg, Hill, & Cabana, 2008) it may be more appropriate to focus on the child's beliefs

- Klok, T., Brand, P. L., Bomhof-Roordink, H., Duiverman, E. J., & Kaptein, A. A. (2011). Parental illness perceptions and medication perceptions in childhood asthma, a focus group study. Acta Paediatr, 100(2), 248-252. doi:10.1111/j.1651- 2227.2010.02024.x
- Yilmaz, O., Eroglu, N., Ozalp, D., & Yuksel, H. (2012). Beliefs about Medications in Asthmatic Children Presenting to Emergency Department and Their Parents. Journal of Asthma, 49(3), 282-287. doi:10.3109/02770903.2011.654021
- Orrell-Valente, J. K., Jarlsberg, L. G., Hill, L. G., & Cabana, M. D. (2008). At what age do children start taking daily asthma medicines on their own? Pediatrics, 122(6), e1186-1192. doi:10.1542/peds.2008-0292

A Smartinhaler™ qualitative study

Poor understanding of asthma and ICS treatment (Motivation)

... **I didn't know what was in it, what it was actually doing**. It was for my asthma but what part of it is it doing. **I'm fine, why am I taking** this I'm fine? (P8, M, 13yrs)

The importance of routine (Capability)

…because it's just out of my routine, 'cause I don't really have a specific routine. (P4, F, 16yrs)

The effect of family (Opportunity)

Because my family know about my asthma, they mention to me, have you taken your purple pump, and **sometimes I would say, yes, but I hadn't actually, so then I'd quickly run upstairs and take my pump**... (P5, F, 12yrs)

Concerns (Opportunity/ Motivation)

I'm also **concerned about the long-term effects** of the inhaler…**so I might take it a little less regularly.** (P6, M, 14yrs)

Forgetfulness (Capability)

I think it would just be where I'd forget, 'cause **even now I forget and sometimes I just wouldn't take it because I didn't think it had an impact**. (P5, F, 12yrs)

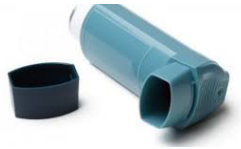
Societal impact (Opportunity)

I basically did that [reduced the dose] because I thought I was taking too much and that was probably because **someone was saying I was taking too much** and I wasn't getting any symptoms. (P8, M, 13yrs)

Top tips for optimising ICS use

- We can question patients' capability, motivation and opportunity barriers to optimal adherence
- Speak to the child primarily rather than the parent

- Parents have more concerns about medication such as side-effects (Conn et al., 2005) whereas children struggle to understand the need for daily treatment often relying of the reliever inhaler (Pearce et al. 2018)



- If the patients say they just forget, always probe

- Forgetfulness if often a socially desirable way of explaining non-adherence

- Yilmaz, O., Eroglu, N., Ozalp, D., & Yuksel, H. (2012). Beliefs about Medications in Asthmatic Children Presenting to Emergency Department and Their Parents. Journal of Asthma, 49(3), 282-287. doi:10.3109/02770903.2011.654021
- Conn, K. M., Halterman, J. S., Fisher, S. G., Yoos, H. L., Chin, N. P., & Szilagyi, P. G. (2005). Parental beliefs about medications and medication adherence among urban children with asthma. *Ambul Pediatr, 5*(5), 306-310. doi:10.1367/A05-004R1.1
- Pearce, C., Chan, A., Horne, R., Fleming, L., Bush, A., & Jamalzadeh, A. (2018). "It's Like Trying to Fit a Piece into an Already Not Working Puzzle": Non Adherence to Inhaled Corticosteroids in Young People with Problematic Asthma: A Qualitative Study. *International Journal of Behavioral Medicine, 25*, S191-S191.

Systematic review: common techniques

Behaviour Change Technique	Examples of BCTs used in Effective Interventions
Prompts and cues	Electronic monitoring device reminders, mobile phone reminders
Feedback and monitoring	Open, non-judgemental discussions about adherence, identifying barriers and personalised strategies to overcome them
Pharmacological support	Providing inhalers, or providing repeat prescriptions
Information about health consequences	Check their understanding of asthma physiology and emphasis on its chronicity, discuss triggers
Instruction on how to perform a behaviour	How to use a spacer and the device ICS new or old
Goal setting and action planning	Goals and plans of how to reach those goals were made with the child and parent
Reward	Develop a target adherence rate and an associated reward, increasing supervision by the parent, or linking improved adherence with a desirable outcome other than improved asthma such as better sporting performance

- Pearce, C. J., Chan, A. H., Jackson, T., Fleming, L., Foot, H., Bush, A., & Horne, R. (2022). Features of successful interventions to improve adherence to inhaled corticosteroids in children with asthma: A narrative systematic review. Pediatric Pulmonology, 57(4), 822-847.

Take Home Messages

- Non-adherence is a costly problem in the UK

- Adherence to ICS in children is measurable and modifiable
- Beliefs about asthma and ICS and practical barriers need to be explored
- Forgetting is the result not always the cause of non-adherence

- Visualisation of asthma and its treatments may be effective
- There are effective techniques to change adherence behaviours and it starts with your interaction with the patient

Thank you for listening
Any questions?

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