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The effects of intervention on medication compliance and asthma control in children with asthma.

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A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy, the University of Sydney.

Department of Pharmacology.
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* 'Thesis' includes 'treatise', dissertation' and other similar productions.
Preface

The work presented for examination in this thesis was carried out under the supervision of Associate Professor J.P. Seale, Professor P. Ley and Dr C.M. Mellis.

The candidature was conducted in the Faculty of Science through the Department of Pharmacology, and all research was performed at the Children's Hospital, Camperdown.

The research was approved by the Ethics Committee of the Children's Hospital, Camperdown.

No portion of this work has been submitted by the candidate for the award of any other degree.
Publications and Communications

Some of the work presented in this thesis has been described in the following publications and communications:


The effects of intervention on medication compliance and asthma control in children with asthma - N.A. Smith.

SUMMARY

Asthma can be a chronic disorder requiring regular medications if the symptoms are persistent. The regimen is often complex, involving a number of drugs and a variety of routes of administration. Although drug therapy may not alter the natural history of asthma it can improve lung function enabling those with asthma to lead as near a normal life as possible. Thus medication compliance is an important factor in the management of asthma.

* IS MEDICATION COMPLIANCE A PROBLEM?

Previous study

An earlier survey (Smith et al. 1984) showed that 43% of 200 children prescribed daily medications for the treatment of asthma were taking less than 70% of their medications as the physicians had recommended.

Consequently, the present studies were undertaken to assess the effects of intervention on medication compliance and asthma control in children with moderately severe asthma attending the Asthma Clinics at the Children’s Hospital, Camperdown.

* CAN MEDICATION COMPLIANCE BE IMPROVED?

Intervention study

The intervention (I) comprised (a) written information about the asthma medications (distributed by the pharmacists, accompanied by counselling) and (b) behavioural strategies (effected by the physicians).
Children were randomly assigned to either Test (received the intervention) or Control (received no intervention) groups. Compliance was assessed by interviewing parents using a questionnaire, and expressed as \[ \text{Doses taken for 1 week \times 100\%} \]
\[ \text{Doses prescribed for 1 week} \]

At follow-up, mean compliance values for Test and Control groups, 78.0% (s.e.m.=2.1, n=93) and 54.5% (s.e.m.=2.9, n=80) respectively, differed significantly (\(P<.001\), Mann Whitney U-test). The Test group had significantly better knowledge of asthma and of the medications than the Control group, and improved knowledge correlated with good compliance. Health beliefs correlated with concurrent compliance, but had no predictive validity. Satisfaction measures, however, not only correlated with concurrent compliance but also predicted future compliance.

**DOES ASTHMA CONTROL ALSO IMPROVE?**

**Clinical outcome study**

At each of 6 Clinic visits, spirometry was performed, medication compliance was assessed by questionnaire as before, and the physicians made a global assessment of asthma Severity and provided a score for Control of Asthma. Peak expiratory flow rates (PEFR) were taken twice daily for one month prior to the Clinic visit. The coefficient of variation (\(\%CV\)), representing the mean PEFR and variability of the day-to-day readings, was calculated. After at least 2 Clinic visits, 78 subjects received the intervention and of these 53 completed the 2-year period of study.
Following the intervention, %Compliance improved (Pre-l=72.7; Post-l=83.4, t=4.92, s.e.m.=2.2, P<.001, paired t-test), as did %CV (Pre-l=37.2, Post-l=32.4; t=2.01, s.e.m.=2.4, P<.047), Control of Asthma Score (Pre-l=2.1, Post-l=1.8; t=2.35, s.e.m.=0.10, P<.021) and assessment of Severity (Pre-l=11.0, Post-l=9.9; t=3.64, s.e.m.=0.30, P<.001). In addition, %CV correlated with the physician's assessments of Severity, scores for Control of Asthma and pre-bronchodilator spirometry, indicating that %CV was a relevant measure of asthma control.

Reference

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Finally, I thank Mum, Dad and my family for their invaluable and continued support over the years.
For Mum and Dad

Dancing teaches you a sense of accomplishment. The discipline of dance teaches you self-discipline. You know you can achieve what you set out to do, not just with dance, but with anything you choose
- Melissa Hayden.
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## INTRODUCTION

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Definition: asthma

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Medication compliance in children with asthma (1984) cover

Effects of intervention on medication compliance in children with asthma (1986)
INTRODUCTION

Definition: Compliance

Medication compliance is defined for this thesis as adherence by a patient to a medication programme prescribed by a physician for the management of a disease (after Dash 1980).

Thus, non-compliance may take many forms such as:
* omitting a dose
* taking the wrong dose
* taking a dose at the wrong time or in the wrong sequence
* using medication for the wrong purpose
* using the wrong administration technique or route
* taking a non-prescribed medication without the physician's knowledge

This definition describes how closely the subject's health behaviours correlate with the advice given by the physician, and includes unintentional as well as deliberate misuse of medications by the patient, but excludes errors made in prescribing, dispensing and self-medicating with non-prescription drugs. These latter areas would warrant a much more wide-ranging survey than the present study.

The term "compliance" is seen by some to imply a master-servant relationship between physician and patient, accompanied by overtones of blame and wrong-doing on the patient's part. It will
be used here interchangeably with "adherence", however, as they are useful and well-accepted terms.

**Definition: Asthma**

Asthma is characterised by a narrowing of the airways that is variable, and is reversible either spontaneously or after appropriate medications. The narrowing is due to:

* bronchoconstriction
* mucosal oedema and inflammation
* mucosal hypersecretion.