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Review Article

UNDERSTANDING PATIENT MANAGEMENT: THE NEED FOR MEDICATION ADHERENCE AND PERSISTENCE

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ABSTRACT
Poor patient adherence to medication is one of the major factors contributing to poor disease control, in particular in asymptomatic chronic diseases like hypertension and dyslipidaemia. The physical and economic burden on patients and the health care system as a result of non-adherence is great. It is estimated that poor adherence to hypertension medication accounts for as many as 7.1 million preventable deaths annually. Hence recognising and identifying non-adherence is the first step to addressing this problem. Medication adherence can be measured in various ways including self-report to electronic monitoring. In order to be more successful in managing non-adherence, attention must be paid to barriers to adherence, namely the interplay of patient factors, the health care providers themselves and the health care system itself. Taking these into account will probably have the greatest impact on improving medication adherence. Consequently strategies to help overcome these barriers are of paramount importance. Some of these strategies will include education of patients, improving communication between patients and health care providers, improving dose scheduling, providing drugs with less adverse effects, and improving accessibility to health care. Poor mediation adherence continues to be a huge challenge. While the patient is ultimately responsible for the taking of medication, good communication, involving the patient in decision making about their care and simplifying drug regimens go a long way in improving it.
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Poor patient adherence to medication is one of the major factors contributing to poor disease control, in particular in chronic diseases. This has tremendous implications and poses both physical and economic burden on the patient, their families, the health care providers and the health care system.

DEFINITIONS

Various terminologies have been used interchangeable to describe the way patients take or do not take their prescribed medication. The word compliance suggests passivity on the patient's part; that he is just passively following the doctor's orders. It also suggests that the treatment plan is not based on a therapeutic relationship or on a contract established between the patient and the doctor.

Adherence on the other hand defines the extent to which a patient takes medication as prescribed by the health care professional. Adherence is measured in terms of the percentage of prescribed doses taken per defined period of time and conversely non-adherence is missing the medication.[1]

Persistence represents the accumulation of time from initiation to discontinuation of therapy and this is measured in terms of time. Consequently non-persistence is the premature discontinuation of treatment, i.e. not staying on the medication.

MAGNITUDE OF PROBLEM OF ADHERENCE AND PERSISTENCE

Poor adherence is probably more common in chronic conditions that are relatively asymptomatic for example hypertension. Many studies have shown that two-thirds of hypertensive patients do not achieve control.[2,3] The WHO estimates that sub-optimal control of blood pressure causes 7.1 million deaths annually. And the major (and modifiable) reason for lack of control in most chronic disease management is failure of patients to take their medication.[4] JNC 7 has identified poor medication taking behaviour (specifically non-adherence) as one of the main causes of failure to control blood pressure in hypertensive patients.[5] In fact, studies on "refractory" hypertension showed that 20% had lapsed adherence and 30% became controlled as a result of monitoring by micro-electronic monitors.[6]

In an estimate of non-institutionalised Medicaid patients in the United States, non-adherence consumed US$873 more per patient in health care costs during the first year due to increased hospital expenditure.[7] It also causes substantial worsening of disease and even death. 33-69% of medication related admissions were due to poor adherence. Studies have shown that those with poorer adherence have greater rates of stroke, heart failure and other cardiovascular complications.[8]

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EPIDEMIOLOGY OF MEDICATION TAKING BEHAVIOUR

Adherence can vary from zero to greater than 100% where patients take more than the prescribed doses. Acceptable adherence rates are around 80% but it should be greater for other conditions like HIV drug treatment where one should aim for 95%. For obvious reasons adherence are higher for acute conditions. Unfortunately, for chronic conditions, even when under clinical trials conditions where supervision is much more closely monitored, adherence rates are only around 43-78%.[9,10.] A systematic review of adherence for hypertension treatment showed adherence rates of only 9-37%.[11] Self-reported adherence rates also show that 35% are non-adherent. Even with dyslipidaemia, where the relationship to myocardial infarction is much better known to patients, half discontinue treatment within six months of starting medication.[12]

Studies using electronic monitoring have shown 6 general patterns:[13]

- 1/6 are close to perfect adherence
- 1/6 take nearly all doses but with some timing irregularity
- 1/6 miss the occasional single day's dose and some timing irregularity
- 1/6 take drug holidays 3-4 times per year with occasional omission of doses
- 1/6 take drug holiday monthly or more often and with frequent drug omissions
- 1/6 take few or no doses while giving impression of good adherence

Not unexpectedly, a systematic review of the association between dose regimens and medication compliance reported that adherence was inversely proportional to frequency of dosing.[10]

MEASUREMENT OF MEDICATION ADHERENCE

There are various ways to measure medication adherence.[14] They can vary from self-reporting to electronic monitoring. Broadly the methods can be classified into 3 categories.

1. subjective egg patient interview
2. direct (e.g. analysis of drug levels)
3. indirect (e.g. pill counting, prescription refills, electronic monitoring of medication use)

Each of these methods has their own advantages and disadvantages

Subjective measurement

An example of this subjective evaluation is by using the Morisky Mediation Taking Behaviour Scale.[15] It consists of 4 items and is simple and practical to use. Questions include "*Do you ever forget to take your medicine?"; "Are you careless at times about taking your medicine?*" When used for example in hypertension management, the blood pressure is less likely to be controlled if answers are in the affirmative "yes"

Self-reporting is often inaccurate because of difficulties of recall, attempts to please the health care provider or a combination of these reasons. Furthermore doctors tend to overestimate medication adherence in their patients as patients tend to want to please their doctors and answers what the doctors want to hear.[16] Studies have shown poor correlation between the doctor's estimate and objective pill counts. Doctors' judgement has low sensitivity (<40%) but good specificity (90%),[17,18] in other words good at detecting good adherence but not good at detecting poor or partial adherence.

Direct measurement

Measuring drugs levels in blood or urine can be a good method of determining poor or good adherence. It is of particular use in patients on anti-epileptic medications like phenytoin or Valproic acid. However such tests are expensive and burdensome to health care providers. Furthermore it s open to manipulation by patients where patients dutifully take the medication when the tests are about to be done giving a false impression of good adherence.

Directly observing the patient take the medication is probably the most accurate method. This has been used successfully for short-term treatment like tuberculosis (DOTS) but is expensive and impractical for routine use in particular for conditions like diabetes mellitus and hypertension where long term drug treatment is needed.

Indirect methods

Most of the indirect methods like diaries, pill count, prescription refills (medication collected but not ingested) and even electronic monitoring (pills taken out but again not ingested)[19, 20] are subject to patient distortion. The advantages of these methods are that they are inexpensive and are practical and generally easy to perform.

IDENTIFYING POOR ADHERENCE

Race, sex and socio-economic status do not seem be consistently associated with poor adherence.[21] However there are some predictors of poor adherence Box 1. The presence of these predictors should alert us to the possibility of poor adherence.

The simplest, albeit inaccurate, way of detecting poor adherence in a busy clinical setting is to ask the patient non-judgementally. Phrased as *"I know it must be difficult to take all your medications regularly. How often do you miss them?"* makes the patient feel more comfortable in telling the truth and helps identify poor adherence. Patients who admit to miss taking medication are probably candid.

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Medication adherence is dynamic and is not constant over time. Most deviations are omissions and delays in timing of doses. Partial adherence occurs where medication taking improves about 5 days before and 5 days after a scheduled clinic visit but thereafter declines. This phenomena has been refereed to as "white coat–adherence"[22,23] Recognition of the dynamic nature of adherence is important when considering ways to improve poor medication taking.

Asking for adverse effects of medication is important as presence of side-effects is likely to make the patient not take the medication. Furthermore, asking whether they know why taking the medication and the benefits of taking their medication may expose poor adherence.

Box 1. Predictors of poor adherence

Treatment of asymptomatic disease
Patient's fear of "addiction"/tolerance to medication
Cost of Medication
Adverse effects of medication
Inadequate follow-up and discharge plan
Poor doctor-patient relationship
Presence of Barriers to Care or medication
Complexity of treatment
Missed appointments
Presence of Psychological problems, particularly depression
Patient's lack of belief of benefit of medication
Patient's lack of insight into the illness
Presence of Cognitive impairment

Adapted with permission Ref 14.

BARRIERS TO ADHERENCE

The level of adherence depends on 3 factors namely

1. Patient factors
2. Doctor factors
3. Health System factors

Patient Factors:
Usually the common barriers to adherence are in the patient's control. The common reasons given by patients for non-adherence[14] are listed in Table 1:

Table 1. Frequency of common reasons cited by patients for non-adherence

Reasons	Percentage
Forgetfulness	30%
Other priorities	16%
Decision to Omit	11%
Lack of Information	9%
Emotional Factors	7%
No Reasons given	2%

It is important to identify patients' reasons for non-adherence so that we can try and address them and hence improve adherence.

Doctor factors
Doctors can contribute to poor adherence by prescribing complex regimens. Failure to explain the benefits and adverse effects of treatment may well cause poor adherence. Furthermore not paying attention and consideration to patient's life-style also contributes to poor adherence. A poor therapeutic relationship with the patient and not giving consideration to cost of medication will undoubtedly add onto to poor adherence.

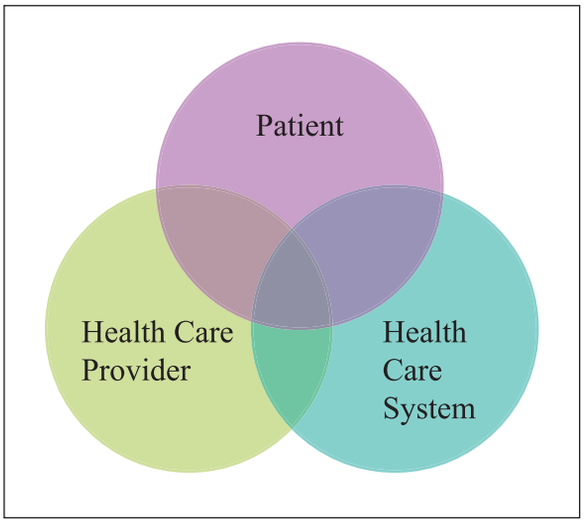
Health care system barriers
Health Care systems are often complex and frustrating. These often create barriers to non-adherence. Examples of barriers are listed in Box 2.

Box 2. Health care system barriers to poor adherence

Complicated health care system
Limiting access to health care
Restricted formulary
Switching to different formulary/formulation
Prohibitively high cost of medication
Unfriendly and unhelpful clinic staff

We must take cognizance of these 3 interacting barriers i.e. between the patient, the health care provider and the health care system (Fig 1). Taking these into account will probably have the greatest impact on improving medication adherence.

Fig 1. Interactions between the patient, health care provider and health care system



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INTERVENTIONS TO IMPROVE ADHERENCE:

Many intervention techniques have been proposed, designed and tested to try and improve medication adherence. These strategies can be divided broadly into 4 categories namely:

1. Patient education
2. improving communication between patients and doctors improving dosing schedule
3. improving accessibility to care e.g. longer hours when clinics stay open, including evening clinics and decreasing shorter waiting times

Table 2 summaries some of these strategies.

Table 2. Strategies and interventions to improve adherence to medication

Patient Education o provide information about illness and its consequences o include family members in education o enlist ancillary staff to assist in education
Improving Communication between Patients and Doctors o elicit patient's feelings, beliefs and concerns about illness o involve patient in decision making o explain need for treatment o emphasize value of adherence Improving Dosing Schedule o identify poor adherence o elicit reasons for poor medication taking ▪ presence of adverse events ▪ prohibitive costs of medication o simplify regimen ▪ use once daily dose ▪ use of fixed dose combination drugs o use more "forgiving" drugs ▪ drugs with less adverse events ▪ medication with longer half-life ▪ medication not dependent on half-life ▪ extended release formulations
Improving Accessibility o better access to medication o shorter waiting time o appointments that are more convenient to patients o longer opening hours e.g. evening clinics o institute an appointment system o implement a recall/reminder system

Educational intervention not only for the patient but for the family members as well is important. Enhancing communication between patients and the doctors is a key and effective strategy in boosting e patient's ability to follow a medication regimen. In busy centres when doctors cannot spare the time, enlisting the use of ancillary support staff like pharmacists and nursing staff can be useful too.

Strategies to improve dosing schedule would include the use of pill boxes to organise daily doses, cues to remind patients to take medication and simplifying regimens to once daily dosing. Minimising the total number of daily doses is more effective than minimizing the total number of medications.[24,25]

Other strategies, taking the example of hypertension treatment, include selecting a more forgiving agent that has less adverse effects (e.g. angiotensin receptor blockers over ACE-inhibitors and â-blockers) 24, that does not depend so much on half-life (e.g. thiazide diuretics) or that has longer half-life, where efficacy is not affected by delayed or missed dose (e.g. telmisartan over other angiotensin receptor blockers with shorter half-life).

Furthermore follow-up visits to clinics should be made convenient and efficient for the patient. Reducing waiting time is helpful and solving transportation and parking problems which is a perennial hindrance in most public hospitals and clinics would also lessen the likelihood of the patient defaulting on their treatment.

Most methods of improving adherence involved combinations of behavioural interventions and reinforcements, enhancing social and emotional support, increasing convenience of care, providing educational information about the patient's condition and treatment and other forms of supervision and attention Innovative strategies that are practical for routine clinical use need to be developed e.g. handheld devices like personal digital assistants (PDAs) two way pagers, cell phones, medication vials equipped with alarms and reminders. It becomes obvious that any successful method will be complex, labour intensive and expensive.

Poor mediation adherence continues to be a huge challenge particularly in asymptomatic chronic illnesses like hypertension, dyslipidaemia. While the patient is ultimately responsible for the taking of medication, good communication, involving the patient in decision making about their care and simplifying drug regimens go a long way in improving it.

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"Insanity is doing the same thing over and over and expecting a different result."

The above quote is most often attributed to Albert Einstein (1879-1955). However, an internet search turned up other possible sources: Benjamin Franklin (1706-1790), old Chinese proverb, and Rita Mae Brown (American writer, 1944-)
http://en.wikiquote.org/wiki/Insanity