
IMPROVING ADHERENCE BEHAVIOUR

WITH TREATMENT REGIMENS

BEHAVIOURAL SCIENCE
LEARNING MODULES



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IMPROVING ADHERENCE BEHAVIOUR WITH TREATMENT REGIMENS

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Introduction

The purpose of this paper is to provide information and strategies to physicians for improving adherence to medical regimens among patients. The text will begin by defining the term "adherence". This will be followed by a discussion highlighting the magnitude of the problem of non-adherence for both acute and chronic conditions, noting the rational basis of non-adherence in patient's beliefs and experiences relative to health care. Next, a health behaviour model, entitled Descriptive and Change Model of Behaviour (DACMOB), will be introduced. DACMOB was developed as an interactive, stage-type model that aggregates the concepts of many popular health belief models to describe the stages of behaviour change.

Following the introduction of the DACMOB model, a detailed discussion of how each of the characteristic stages of DACMOB influence adherence behaviour will be presented. Finally, a number of adherence-related intervention approaches and techniques identified within each cell of the DACMOB model will be included.

Methods for altering the characteristics of the treatment regimen will include establishing within-regimen priorities, implementing recommendations gradually, and when clinically appropriate, modifying dosage and scheduling. Techniques for assessing and modifying health beliefs held by the patient stress the importance of including an "educational diagnosis" as part of the medical history and interview. During the patient interview, the health care worker may assess the patients' perceptions of their personal susceptibility to the condition, as well as acceptance of the diagnosis, perceptions of the severity of the condition, beliefs about the efficacy of the prescribed regimen, and barriers to undertaking the prescribed therapy (e.g., fear of regimen side effects or difficulties in following the regimen).

The Definition of Adherence

The inability of patients to adhere to a treatment regimen is a problem universally important in all levels and specialties of health care. The term adherence is used to imply the extent to which a person's behaviour (in terms of taking medications, following diets, or executing life-style changes) coincides with medical or health advice (Meichenbaum and Turk, 1987). Our use of the word *adherence* rather than *compliance* arises from a number of authors arguing that the term compliance connotes a passive patient faithfully following the advice and directions of the health care worker (Varni and Wallender, 1984). On the other hand, the term adherence implies an active, voluntary, collaborative health treatment plan that incorporates the beliefs and attitudes of the patient (Kristeller and Rodin, 1984).

Adherence covers a number of diverse behaviours including:

1. Propagating and maintaining a treatment programme.
2. Keeping follow-up appointments.
3. Correct use of prescribed medication.
4. Following appropriate life-style changes (e.g., diet, exercise, habit extinction).
5. Avoidance of contraindicated behaviours (e.g., not using alcohol with sedatives).

A diverse range of behaviours are encompassed under the term treatment adherence because, as we shall consider, different interventions may implicate different forms of behaviour to elicit adherence. For the purposes of this paper, the discussion will be limited to issues relating directly to the treatment programme of a newly diagnosed patient. The complexity of the problem of non-adherence is demonstrated by the magnitude and scope of its effect.

The Incidence of Adherence

Although the exact level of medical treatment adherence is difficult to determine, most estimates range from 8% to as high as 96%, with an average reported adherence of about 50% (Masek, 1982). Marston (1970) reported that the incidence of adherence to prophylactic medication may be lower, with an average of 30-35%.

During each stage of seeking medical care, adherence plays an active role. Firstly, 20% to 50% of patients do not keep scheduled appointments. The rate of appointment-keeping may be higher (75%) when patients initiate the appointments themselves (Sackett & Snow 1979). When patients do appear for appointments, 20% to 60% of those who are prescribed medication will discontinue its use prior to being instructed to do so by a health care worker; 19% to 74% will not follow regimen instructions; 25% to 60% will make mistakes in self-administration of medication and 35% of such errors are sufficient to endanger the patient's health (Stimson, 1974). Of all patients, 30% to 40% fail to follow preventive regimens and 20% to 30% fail to follow curative (relief of symptoms) medical regimens. Additionally, when long-term medication is prescribed, 50% fail to adhere after six months to three years (Sackett, 1979).

As an extreme example of the seriousness of non-adherence to treatment, the following example is provided. Vincent (1971) studied patients being treated for glaucoma. In the study, patients were told that "they must use eye drops three times a day or they would go blind". The study indicated that initially only 42% of the patients were adherent to the treatment regimen. When the disease had progressed to the point that patients had become legally blind in one eye, adherence improved by only 16%, to 58%.

The level of regimen adherence varies depending upon the type of treatment, with the highest rates of adherence occurring for treatment with direct effect on the symptoms of the disease (injections, chemotherapy), treatment programmes with high levels of supervision and monitoring, and conditions with acute onset. In contrast, the lowest adherence rates occur with patients who have chronic disorders with no immediate discomfort or risk, when lifestyle changes are required, and when prevention instead of symptom relief is the outcome. Listed below are studies that have looked at the problem of non-adherence in reference to specific disease, age and professional categories.

Cancer

Only 40% to 60% of adolescent cancer patients take the prescribed medication as directed by their physician (Smith, Rosen, and Trueworthy, 1979; Tebbi et al., 1986).

Diabetes

Cerkoney and Hart (1980) discovered that only 7% of diabetic patients adhere to all of the recommendations considered necessary for proper control of diabetes. In a study performed by Watkins, Roberts, Williams, Martin, and Coyle (1967), 80% of diabetic patients administered insulin incorrectly, 73% did not follow their diet instructions, 50% did not perform proper foot care, and 45% did not test urine correctly.

Mental Disorders

Van Putten (1974) reported that 24% to 63% of schizophrenic outpatients consume less than the prescribed dosage of antipsychotic medication. Between 9% to 57% of bipolar affective disorder patients terminate lithium carbonate treatment against medical advice (Cochran, 1986).

Hypertension

Fifty percent of patients newly diagnosed with hypertension fail to make a referral appointment. As many as 50% of patients seeking treatment drop out of care within a year. Of those who remain in treatment, only two-thirds consume enough medication to control their blood pressure adequately (Vetter, Ramsey, Luscher, Schrey, and Vetter, 1985).

Addictive Behaviours

In the treatment of alcoholism, 75% of patients drop out before completion of a treatment programme. In the treatment of other addictive behaviours, such as smoking, heroin use, and other drug abuse, 60% of those completing treatment programmes relapse within three months after therapy, increasing to 70% at six months, and 75% at 12 months (Hunt and Bepalec, 1974).

Elderly (65+)

The average adherence rate among the elderly is 45% with a range of 38% to 57%. Non-adherence in this age group usually takes the form of intentional underuse of prescribed medication (Amaral, 1986). As for other ages, degree of adherence depends on what is being treated and the complexity of the regimen.

Children

Parents adhere to medication regimens prescribed for their children only about 50% of the time (Olsen et al., 1985). As many as one-half of parents with children receiving therapeutic behaviour modification treatment discontinue its use against medical advice (Pelham and Murphy, 1986).

Health Care Professionals

Non-adherence rates among health care professionals is appalling, with a median of 80% and a range of 88% to 0%. The professionals studied include psychologists, physicians, pharmacists, nurses, and dentists (Ley, 1986).

Non-adherence explained

This lack of adherence among patients can, at least in part, be explained by a number of factors particular to the health care environment that make effective communication between the health care worker and the patient difficult. Some of these factors include:

1. During the course of their medical education health care workers learn approximately 13,000 new technical terms that they often use when speaking with patients (Blackwell, 1979).
2. During a 20-minute office visit, the medical doctor spends less than two minutes giving treatment information to the patient (Waitzken and Stoeckle, 1976).
3. Ley (1982) indicates that one-third of patients are dissatisfied with their interaction with medical doctors.
4. Medical doctors often overestimate the amount of time spent giving information to patients and underestimate the patient's desire for information related to their condition (Hanson, 1986).
5. Geersten, Gray, and Ward (1973) indicate that patients who felt their medical doctors spent an inadequate amount of time with them were less likely to adhere to medical advice.

It is generally believed that if the patient interaction could be improved, patients' cooperation with the prescribed regimen would increase (Becker, 1985). Traditionally, adherence tactics have been directed at the patient (e.g., providing instructional pamphlets). The purpose of this paper, however, is to provide strategies to health care workers that can be implemented during the patient-provider interaction and that take into account the health beliefs and

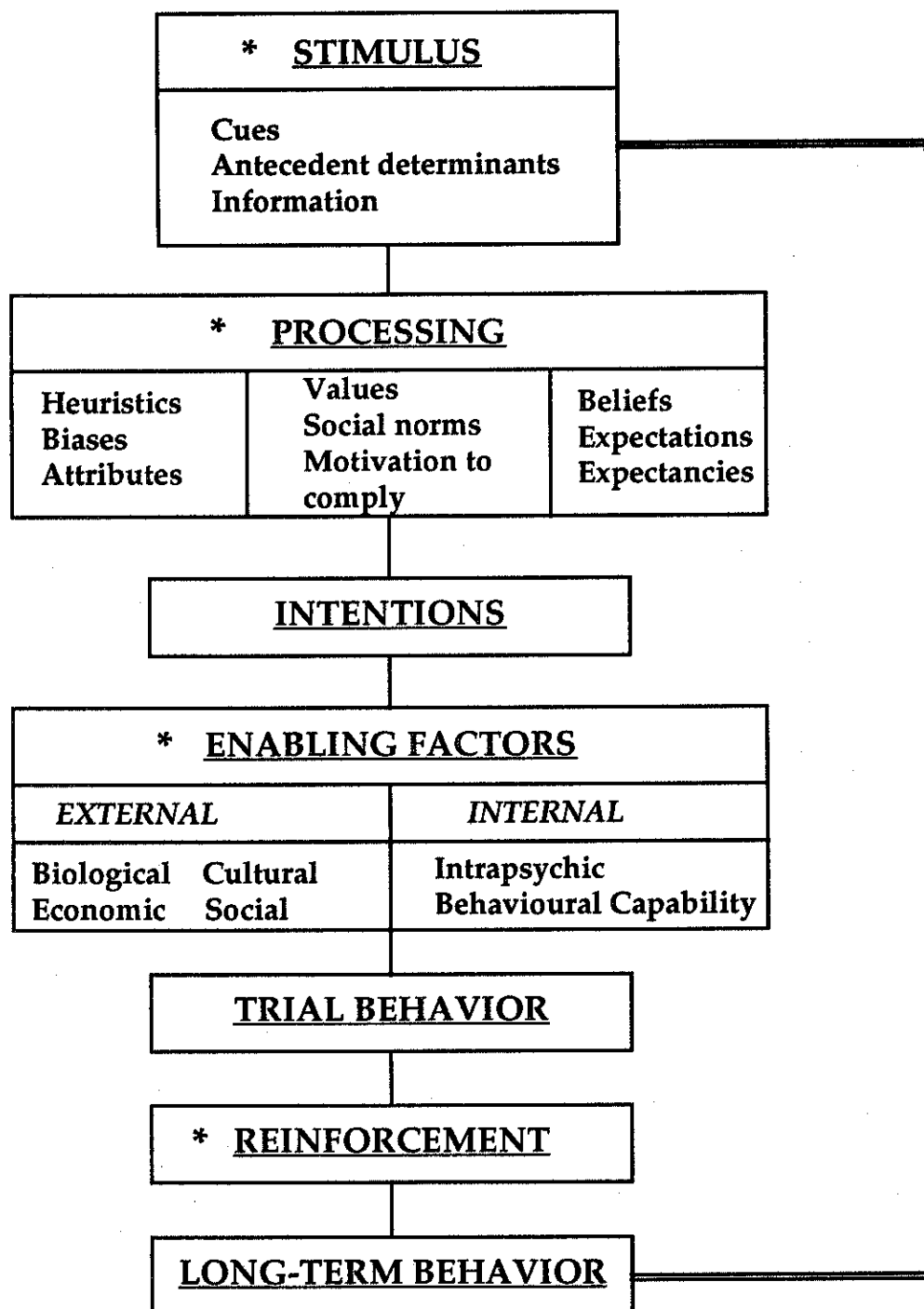
behaviours of the patient. To ensure that the informational and motivational strategies discussed in this paper are effective, the presentation of adherence techniques are synchronized with the mental, social and physical processes by which adherence behaviour is initiated and maintained. In order to explain how proper adherence behaviour is adopted and incorporated into one's life style, the Descriptive and Change Model of Behavior (DACMOB) was developed.

The Descriptive and Change Model of Behaviour (DACMOB)

There is no single theory or conceptual framework that dominates research in treatment adherence. Instead, there is a multitude of theories from which to choose. For the unprepared, the choices can be overwhelming; but for those who understand the similarities and differences among the theories of health behaviour, the growing knowledge can provide a firm foundation upon which to build. The model that is about to be presented provides a workable structure from such a foundation. The Descriptive and Change Model of Behaviour (DACMOB) is an interactive model that provides a step-wise presentation of the behavioural attributes that lead to behaviour modification. The model does not provide any new information to the growing body of literature about health behaviour. Instead, it represents a synthesis of concepts that have been repeatedly found to be important and effective in interpreting and predicting health behaviour.

The DACMOB model incorporates parts of the Health Belief Model [HBM], (Becker, 1974), The Theory of Reasoned Action [RA], (Fishbein and Ajzen, 1975), Attitude Theory [AT], (Petty, and Cacioppo, 1981), Social Learning Theory [SLT], (Bandura, 1969), Behavioural Modification [BM], (Skinner, 1971), The PRECEDE Model [PC], (Green, 1980), The Transtheoretical Approach [TA], (Prochaska and DiClemente, 1983), Decision Theory [DT], (Edwards, 1961), Attribution Theory [ATT], (Harackiewicz and Sansone, 1987), and The Precaution Adoption Process [PAP], (Weinstein, 1988). Because of the brevity of this paper, none of the background models can be presented in any detail. However, the interested reader will be able to trace the origins of a concept or technique presented in the DACMOB model by the presence of the model acronym immediately following the introduction of the concept. The reader can then refer to the article cited for the individual model.

DACMOB
(DESCRIPTIVE AND CHANGE MODEL OF BEHAVIOUR)



KEY * Points demonstrably amenable to intervention
 || Pathway representing conditioned response (habit)
 | Pathway representing volitional response

In the text that follows, each cell of the DACMOB model will be discussed in detail. The DACMOB model contains seven main behavioural processes, identified by cells containing underlined cell labels. Three of the processes (Stimulus, Processing, and Enabling Factors) contain attributes that can be specified and discussed individually. For each of the seven processes and identified attributes, the text will identify the cell and provide a brief definition of the process or attribute contained within.

Following the definition, a section entitled "interventions" will provide a discussion of the purpose for intervention in each cell containing a process and actual intervention strategies for individual cells containing attributes. The interventions provided for cells containing attributes are not presented in any particular order. It is necessary to recognize that each patient is behaviourally different and will require a unique combination of interventions to reach his/her goal of treatment adherence.

Finally, a narrative will be presented, where appropriate, to provide an example of how specific interventions can be incorporated into provider-patient communications. This final section is presented to enable the health care worker to reduce the difficulty of incorporating what seem to be theoretically sound solutions into practice. Health care workers serious about increasing adherence among their patients should rehearse the narrative examples, inserting different adherence plans into the narrative.

Guidelines to Follow When Prescribing Treatment Regimens Using the DACMOB Model

Cell Label: *Stimulus.*

Definition: An action or object that rouses the mind and incites one to perform a certain behaviour [BM].

Intervention: Stimulus control involves manipulating the environment to introduce new information or cues for the new behaviour, or to exclude cues for undesired behaviour [TA].

Cell Label: *Information.*

Definition: Information acquired through an internal search (from memory) and/or an external search (from the environment) which affects the course and direction of the behaviour [RA, PAP].

Intervention: Describe to the patient the condition, how it is to be treated, and the kind of medication or form of treatment required. Give rationale and justification for the medication and treatment strategy. Comment on the goals you hope to achieve with this treatment. Give name of the medication or treatment and check to see if the patient knows the name. Include a brief explanatory model of how and why the drug should be effective. Avoid the use of common medical terms which are not generally understood by the public. Discuss information about treatment details and specific behaviours required of the patient in order to carry out the treatment regimen [Self-liberation, TA].

Encourage the patient to reword your explanations of his/her condition, the reason for medication and the desired outcome. Check patient's comprehension of the treatment schedule. Question directly about medication: Do they know what they are taking? When they should be taking it? How much to take? What should they do if they miss a dose? Ensure that prescription labels show the name of the drug and that medication instructions are clear and understood by the patient. Figure 1 presents a prescription sheet that is designed to provide clear dosage instructions to both literate and illiterate populations. The prescription sheet is most effective if the patient is allowed to "illustrate" the dosage him/herself.

Give simple, typed information sheets that outline reasons for taking the drug, the action, side effects, and what the patient should do if side effects occur. Caution about drug-drug and drug-food interactions, and other therapeutic contraindications. Caution against taking more than is prescribed and against self-prescribed reductions in dosage. Figure 2 presents a generic information sheet for the drug Tetracycline.

Narrative: "Mr. Brown, I would like to review with you the results of your tests. The condition that you have is called _____. This condition is not a rare one and does effect _____% of the population. As you know from your history, this condition can be quite uncomfortable (describe the chief complaints with which the patient presented). We have a specific treatment for this, which consists of a medication called _____. The medication is usually effective but sometimes has some side effects that we can attempt to control if they

occur. It will be important, however, to take the medication exactly as it is explained" (At this point the health care worker explains how the medication is designed to affect the patient's symptoms and/or underlying illness).

Cell Label: Cues.

Definition: The stimulus necessary to trigger the decision-making process [HBM]. Cues may be internal (e.g., symptoms) or external (e.g., interpersonal interactions).

Intervention: There are two types of cues that can be prompts to reduce patient forgetfulness.

1. Direct cues: Prompts that draw immediate attention to the medication. This strategy may involve placing medication in a highly visible location (e.g., taping the pill bottle to the calendar) [Stimulus Control, TA; Conditioned Stimulus, BM]. Other examples of direct cues include:

- (a) Leave pill bottle in coffee cup or near alarm clock.
- (b) Prepare single dose packets of the medications to be carried in lunch box.
- (c) Prescription stickers on pill bottles with schedule circled.
- (d) Leave prescription container on the dinner table near salt and pepper shakers.

2. Indirect cues: Prompts that remind the patient of the medication. This strategy is effective when medication is stored out of sight (e.g., refrigerated). A number of examples of indirect cues include:

- (a) Wristwatches with alarms or small pocket timers.
- (b) Drug reminder charts posted in the bathroom.
- (c) Written memory aids (e.g., stickers with medication instructions posted on refrigerator door).
- (d) Daily medication routine coordinated with specific events during the day (e.g., after breakfast or before brushing teeth).
- (e) Telephone cues from family members.
- (f) Carry around a reminder card in pocket, calendar, or book.

Narrative: "We have discussed the nature of your condition and the reasons why taking the medication will help.....I'm not sure this will be an issue for you, but some patients have had difficulty remembering when to take their medication. Although they were motivated, like you, to stick to their treatment schedule, somehow their circumstances contributed to their forgetting. I am wondering, have you in the past sometimes forgotten to take medicine? If this occurs again, how will you go about reminding yourself? Are there any specific circumstances in

which you could see yourself forgetting? I have a few ideas that have helped to remind other patients to take their medication." (The health care worker then outlines several cues tailored to the patient's circumstances that may prompt them to remember the treatment regimen).

Cell Label: Processing.

Definition: This is the active process in which the patient thinks about information or cues from sources either internal (from memory) or external (from the environment) [RA, SLT, DT]. The patients make judgments about the quality and importance of the information they have acquired and processed (Bettman, 1979).

Intervention: Provide factual and useful information to the patient that will allow him/her to make sound behaviour modification decisions. Apply the 'Principle of Information Processing Parsimony' (Haynes, 1979) which states that patients seek to process as little information as is possible in order to make rational decisions quickly. Emphasize the details of the regimen and limit the amount of general information about the disease or about the action of the medication. This type of information leads to 'information overload' and does not usually increase adherence. Specific components of processing will be illustrated in the next five sections.

Cell Label: Beliefs.

Definition: The person believes that the prescribed behaviour leads to certain outcomes [RA, ATT, PAP]. When this definition is placed in the context of adherence, it is conceptualized as "the belief that adhering to medical instructions will allow one to avoid illness (or if ill, to get well).

Intervention: Establish a trusting and supportive relationship that demonstrates interest in the patient. Use a warm and empathetic manner, conveying a sense of hope, optimism and confidence in the treatment regimen. Assure the patient that you will provide consistent care through ongoing contact. Assess the patient's beliefs about illness (cause, severity, course) [Perceptions of severity, susceptibility, and barriers, HBM]. Conduct an adherence-oriented history to obtain a comprehensive history of previous experience with pharmacotherapy (including specific dosages and treatment durations) [Antecedent Determinants, SLT]. Elicit and nurture the patient's confidence in treatment.

Narrative: "Mr. Brown, now that we have discussed the nature of your condition and the course of treatment, I would be interested in listening to what you think about the course of action we have developed. What do you think are the most serious consequences of your sickness? How severe do you think your sickness is? Do you think this condition will have a long or short course? What type of treatment were you expecting to receive? What are the most important results you hope to receive from this treatment? What do you fear most about your sickness? Have you taken prescribed medication before? How effective was the treatment regimen? What were the biggest barriers to adhering to past medication plans?" (The actual questioning should be adapted to the specific patient and be responsive to his/her flow of discussion).

Cell Label: *Expectancies.*

Definition: The evaluation of the potential consequences (or outcomes) of the intended behaviour and the subjective probability of the behaviour leading to those outcomes [DT, SLT, AT, TA, RA]. In the context of adherence, expectancies include the belief that a specific health action will prevent (or ameliorate) illness. It is the individual's estimate of the threat of illness and the likelihood of being able, through personal action, to reduce the threat.

Intervention: Describe the specific purpose and expected action, in lay terms, of prescribed medication or treatment. Encourage discussion concerning cost and risks versus benefits of following the treatment regimen [DT]. When appropriate, indicate that the prescribed dosage may have to be adjusted in order to obtain an optimal effect. If appropriate, indicate that the medication may have a delayed effect or "lag period", when little or no therapeutic response is evident. Introduce the idea of progressive improvement or gradual response to treatment to combat the patient's false expectations of an "all or none" response to medication. Then discuss immediate and delayed beneficial consequences of the medication [TA]. Stress that long-term benefits will outweigh any short-term inconvenience. Make sure the patient understands that some medications take time to exert their effects.

Narrative: "Let me describe what we expect the medication to do so that you will know the specific symptoms we are attempting to treat. This will help you to monitor your progress and help us set up the best medication and treatment schedule for you. It is important for you to

understand that you may not experience the beneficial effects of the medication immediately. You also may experience some side effects of the medication initially. Don't get discouraged. We will stay in close contact and adjust your medication accordingly. I will contact you three to four days after this visit to check on your progress and discuss any problems you may be experiencing with the treatment regimen." (At this point the health care worker outlines the course of the treatment, emphasizing again the need for the patient to expect gradual improvement).

Cell Label: *Social Norms.*

Definition: The person's belief that specific individuals or groups think he should or should not perform the behaviour [RA, TA, SLT]. Generally speaking, a person who believes that most people with whom he/she associates think the behaviour is appropriate will feel under social pressure to adhere to the regimen.

Intervention: Assure the patient that the illness was not the consequence of some character flaw or weakness. Indicate that the disease is not rare (if that is so) and that a certain percentage of the population also is seeking treatment for the same ailment. Set up group discussions for patients and family to allow family members to express their concern for the health of the patient and their desire for him/her to be treated and recover.

Narrative: "Mr. Brown, it is important that you understand that illness is a biological process and we as humans can only do so much to prevent disease. Secondly, you should not feel that this disease is a burden that you carry alone. In our country, the same illness affects _____ people every year.

"I am sure that your spouse and children are concerned about your illness. I would like us both to discuss the treatment plan of _____ with your family, so that they can better understand why you are taking the medication, what we expect from the medication, and possible side effects. Is this okay with you?"

"The purpose of meeting with your family will be for you to realize how they may serve as a source of support to you as you adjust your lifestyle to sustain the treatment regimen. Educating your family about your condition and the treatment plan will allow them to more effectively help you monitor your progress."

Cell Label: *Motivation to Comply.*

Definition: The person's motivation to comply with the specific referent groups [RA]. The strength of the perceived social pressure and its impact on behaviour will vary according to how much the individual is motivated (or feels it desirable) to comply with the preferences of the reference group/individuals [RA].

Intervention: Establish a buddy system between patients [Social Acceptance, TA; Risk Consensus, PAP]. Introduce the patient to a successful patient who can share knowledge of how he or she handled problems with adherence [Shaping, BM; Modeling, SLT; Social Liberation, TA]. It might be helpful to initiate groups of non-adherent patients [Consensus, AT].

Narrative: "Mr. Brown, I have discovered that some of my patients find it helpful to be able to talk with another person who has the same illness and has successfully controlled it through medication. I have the name of one of my patients that is willing to act as a contact for you in the event you wish to speak with someone who has had first-hand experience with this illness."

Cell Label: *Weight given to norms and beliefs.*

Definition: This factor identifies the relative weight that is given to personal beliefs and social norms concerning the behaviour in question [RA].

Intervention: Encourage the patient to increase the weight given to specific personal beliefs and social norms which support his/her intention to perform the desired behaviour.

Narrative: "Mr. Brown, as we have chatted, you have expressed your beliefs and fears about the process of your illness and the role that you think medication will play in controlling your symptoms (and/or illness). I would admonish you to feel confident about the treatment plan we have developed. Be assured that you can contact me if you have any questions or concerns.

"You have also identified several sources of potential support that may aid in your efforts to adhere to the medical regimen we have discussed. Be persistent in asking for and expecting help from these people. Let your support group know of your progress so they can share in your success.

Cell Label: *Intentions.*

Definition: Intention to perform a behaviour is the sum of the individual's attitudes toward the behaviour (i.e., the person's beliefs that the behaviour leads to certain outcomes), his or her evaluations of these outcomes and of the social norm involved (in other words, the person's beliefs that certain individuals or groups think he or she should or should not undertake the behaviour, weighted by the person's desire to comply with their wishes) [RA, PAP].

Intervention: Elicit an oral statement of the patient's positive intentions to try the new behaviour.

Narrative: "Mr. Brown, will you promise me to follow the treatment plan we have developed? Will you call me if you find some aspect of the plan that is difficult to follow or that you do not understand?"

Cell Label: *Enabling Factors.*

Definition: Any characteristics of the environment that facilitate health behaviours, or any skills or resource required to attain the behaviour. These are factors that allow an intention to be realized [PRECEDE, BM].

Intervention: Assess for barriers to adherence. In order to perform an adequate assessment, it will be necessary to evaluate characteristics of the patient's external environment that may influence behaviour, and the cognitive factors within the patient that may effect performance in the treatment regimen. The next six sections will identify specific factors that may act as barriers. Once barriers have been identified, specific interventions will be listed that can be initiated to enable the patient to overcome perceived barriers.

Cell Label: *External environment.*

Definition: Factors that are physically external to the person [HBM].

Intervention: Simplify the complexity of the treatment regimen and customize its delivery in the physical environment to optimize adherence [Environment Reevaluation, TA]. Increase the accessibility of health care services by providing assistance with transportation or by providing flexible scheduling options. Involve members of the patient's support group in the treatment plan.

Cell Label: *Resource Management.*

Definition: Manipulating the treatment regimen to simplify and customize the behaviour to fit the external environment [PRECEDE; Acquisition, BM].

Intervention: Simplify regimen if possible. Minimize different medications, number of doses, and schedule variations. Prescribe the fewest number of medications the least number of times per day. Avoid routine prescriptions of non-essential medications (e.g., vitamins). When appropriate, use combination dosages in single tablets or slow release preparations to provide a sustained action. Synchronize the dose schedule of different medications. When appropriate, be flexible in titrating the dosage to manage side effects. Use easy-to-open packing except where otherwise indicated.

Narrative: "Let's take a moment to talk about your dosage schedule. As we have discussed, you should take one tablet every six hours for the first three days. After the first three days, you will take the medication twice a day. It is usually easiest to remember to take your pills at regular times. What time do you get up in the morning and go to bed at night? After three days you should also take your medication at ____ a.m. when you wake up and at ____ p.m. before you go to bed. Does taking one pill in the morning when you wake up and one pill in the evening before you go to bed sound like sensible times to take your medication? Is this something you think you can do regularly?"

"I expect the best amount of medication to be between one and two tablets per day. Your medication must be taken even on days when you are feeling good. Taking the medication regularly will reduce the likelihood of the symptoms returning. Do you foresee any problems in following the prescribed treatment plan?"

Cell Label: *Cultural and Social Aids.*

Definition: The social environment in which we live that influences our behaviour through mandates and norms that attempt to prescribe or prohibit certain behaviours [Normative Beliefs, RA]. A person's social environment includes all the people with whom the person usually comes in contact (e.g., immediate family members, coworkers, neighbours, religious groups, or classmates).

Intervention: If appropriate, involve significant others (spouse, family members, community

agencies) in supervision of the patient's medication schedule. Explain to significant others what the patient is to do and why it is to be done [Helping Relationship, TA].

Narrative: "Other folks with the same condition have discovered that asking the help of supportive family and friends is an effective way of helping them stick to their treatment schedule. I would encourage you to identify people who you feel are supportive of your treatment and involve them in your efforts to monitor your progress. Can you identify specific people at home and at work with whom you would feel comfortable sharing your treatment programme and eliciting their help?"

Cell Label: *Internal Environment.*

Definition: Behavioural factors that are physically internal to the person. It includes the role of confidence (Bandura, 1977), emotions (Weiner, 1987), and skill (Bandura, 1977) in performing a particular behaviour.

Intervention: Evaluate the behavioural skill level, self efficacy, and emotional stability necessary for adherence to the regimen [SLT, HBM, TA]. Specific components of the patient's internal environment will be discussed in the next two sections.

Cell Label: *Behavioural Capability.*

Definition: Behaviour and skill necessary to perform a given behaviour [HBM], [SLT].

Intervention: Review specifics of taking medication or following a treatment regimen:

1. Are there special instructions for preparing the medication for use?
2. Are there special directions or any precautions to follow before administration?
3. What is the proper amount of medication to be taken, when, and for how long?
4. What action should be taken in case of a missed dose?

Discuss ways in which the patient can self-monitor or keep track of drug use during treatment. Help the patient devise ways to remember medication, utilize your advice, and adjust the treatment regimen to particular circumstances [Self-liberation, TA]. Use cues discussed earlier to adapt treatment to features of the patient's life style. In subsequent sessions ask about self-monitoring and give feedback.

Narrative: "In thinking about the schedule we set for you to take your medication, we must consider your daily routine. Beginning today you will be taking your medication every six hours. I would advise using some type of timer or a member of your support group to help you remember to take the medication. After three days you should take your pill at ____ a.m. and ____ p.m. If you brush your teeth at night, one effective way to remember to take your medication at night is to place it near your toothbrush. If you forget to take your medication at night, do not take two doses the next morning. Again, placing the medication near your toothbrush will help jog your memory to take the medication in the morning. I am interested in tailoring the treatment schedule in order that it fit as naturally as possible into your present routine. Do you have any concerns about the treatment or schedule we have developed?"

Cell Label: *Intra-Psychic.*

Definition: Psychological factors that effect a person's confidence in performing a particular behaviour, and emotional coping responses to deal with emotional stimuli [BM, TA, SLT].

Intervention: Assess the patient's attitude toward medication prophylaxis, side effects, fears about being "controlled" by a drug, concerns about addiction and social stigma [Self Efficacy, SLT]. Foster an open discussion of any doubts or concerns the patient may have. Discuss and reduce fear of possible side effects or problems associated with medication or treatment by discussing troubling side effects of the treatment before discussing the therapeutic benefits of the medication. Reassure the patient that the large majority of patients do not experience side effects for most medications. The small majority of patients that may experience side effects usually see a reduction in the severity over time.

Narrative: "It is quite natural to feel some anxiety concerning the newly diagnosed illness and the lifestyle adjustments that may be necessary to adapt to the treatment plan. Some people feel some apprehension about committing to a treatment regimen that may restrict their freedom or autonomy. It is important that we discuss any concerns you have that may reduce your confidence in our treatment plan.

Cell Label: *Trial Behaviour.*

Definition: Initial efforts at performing the new behaviour with simplified parts of the behavioural sequence broken down into

manageable parts, to allow patient to gain success at performance [Cognitive Dissonance, AT]. With continued success, self efficacy increases and the patient can be given progressively more difficult combinations of the behavioural sequence.

Intervention: Prioritize the treatment plan and break it into less complex stages that can be implemented sequentially. For instance, if the regimen requires multiple medications, the most critical medication can be given, then when adherence appears to be adequate, a second medication can be introduced. Try to keep the treatment regimen as simple and non-intrusive as possible. Write prescriptions with limited refills to keep track of medication the patient is taking. Also, have the pharmacy call you when refills are needed in order to keep track of the dosage. Reemphasize that the patient should report any side effects and reassure them that such side effects are not dangerous if reported promptly and corrected. Tell them to telephone if they experience any problems. Encourage patient to write down any questions or concerns that come up and bring them to the next visit.

Narrative: "After a week of taking the medication, I would like to see you again to review the effects of your medication. If the treatment plan seems to be working well for you we may be able to enhance the effectiveness of the treatment by incorporating additional treatments into the regimen or we may be able to cut the amount of some medications needed to control the disease."

Cell Label: *Reinforcement.*

Definition: Any reward or punishment that follows a behaviour or is anticipated as a consequence of a health behaviour [BM, SLT, TA, HBM]. These are factors that are subsequent to the behaviours that provide the continuing reward, incentive or punishment for a behaviour, and contribute to its persistence or extinction.

Intervention: During the next visit, assess the patient's response to the medication and look for early signs of side effects. Ask about side effects in a non-threatening way. Give the patient positive feedback about his or her behavioural modifications (e.g., comment on test results and behavioural signs of improvement) [Reinforcement Management, TA]. Emphasize that following the treatment regimen has led to these results. A number of tangible reinforcements that can be offered by health care workers are:

Positive Rewards.

1. Develop an adherence contract. Adherence contracting involves discussing with the patient specific behaviours that will enhance adherence and how the behaviours can be carried out in order to fulfill the contract and claim a reward (Kirschenbaum and Flanery, 1984). An example of an adherence contract is presented in Figure 3.
2. Praise the patient by informing them that he/she has successfully reduced their risk of experiencing the debilitating effects of the disease by practicing good adherence.
3. Contact the patient's supportive family members or friends and invite them to express their approval of the patient's behaviour modifications.
4. Indicate to the patient that it is rewarding for a health care worker to be in a partnership with someone who is actively changing their physical condition and/or life situation.

Negative Consequence Procedures

1. Review the short and long-term costs of non-adherence with the patient (e.g., unpleasant symptoms, long-term financial costs, and the increased chance of permanent disability).
2. Devise a behavioural contract that outlines specific negative consequences for non-adherence.
3. Have patient make out a nonrefundable money order to a group they despise (e.g., Ku Klux Klan, American Nazi Party) and each time they violate the adherence contract, have the patient mail one of the donations.
4. Indicate to the patient that prolonged non-adherence leads to treatment options that are more invasive, expensive, and debilitating.
5. Advise the patient that if non-adherence continues after two warnings the number of follow-up visits will be increased.

It is important to anticipate that early in treatment some patients may discontinue treatment if they do not observe obvious benefit immediately. Similarly, later in treatment some patients may discontinue medication after obtaining only a partial therapeutic response if they do not understand the need to finish the course of therapy. Remember that patients may not be willing to admit non-adherence, therefore, it should be discussed and ruled out before other diagnostic/treatment efforts are taken. The use of pill counts or information from the pharmacy on refills may alert you to the presence and

extent of the problem. If the patient appears to be non-adherent, do not be judgmental. Attempt to determine what aspect of the treatment behaviour contributed to his/her failure to adhere. Once the aspect of the behaviour is identified, go back through the DACMOB model and redesign an appropriate adherence schedule [Self-reevaluation, TA]. Counsel about the necessity of a complete course of treatment in order to avoid reoccurrence. In protracted treatments discuss termination and, when appropriate, what are the demands, potential barriers, and skills needed in the maintenance phase. Also consider fears about going off medication.

Narrative: "Mr. Brown, in this follow-up visit I want to discuss the progress we have made in controlling your condition. Have you noticed a reduction in symptoms? Have you experienced any side effects? Were you able to stick to the medication schedule we developed? You must not view an upset in the medication schedule as a setback. It was merely an "attempt". An infrequent lapse in following your treatment schedule is a time when we can learn the most about your condition and what can be done to help modify your behaviour to support active adherence to your treatment regimen. Remember, each person is unique and everyone's situation is different. It is our job to find out what works best for you. Remember that there may be some ups and downs, but working together we should find the best treatment plan for you."

"Now, we will begin by trying to discover what aspects of the treatment schedule were difficult for you to follow. Secondly, I would like to develop a treatment contract between the two of us that will provide some incentive for both of us to work a little harder at achieving a medication plan that works for you."

Cell Label: Long-term Behaviour.

Definition: The definition of long term behaviour is ADHERENCE !

Intervention: You must never assume that adherence is satisfactory. Make adherence a priority, and specifically and routinely inquire about it throughout the course of treatment. If a patient appears to be non-adherent, investigate that cause. Consider any possible obstacles to adherence. Remember to treat the whole person, and not just the disease. When indicated, involve other professionals and social agencies to provide needed training and support.

The Assessment of Patient Adherence

Much effort has been devoted to developing techniques that provide reliable estimates of treatment adherence. Unfortunately, at the present time most measures are not accurate and provide little data that is reliable from patient to patient. Combining measures, however, can provide more reliable and informative estimates of adherence.

The most common methods of measuring adherence include direct biological monitoring, health care worker assessments, medication-monitoring devices, pill counts and self reports. In the discussion that follows, each of the above listed techniques will be briefly discussed.

Direct biological monitoring provides an assessment of drug ingestion by measuring the level of the drug itself or metabolites of the drug in the urine, saliva, or serum. This type of monitoring usually does not provide a measure of the amount of drug taken. The patient could take only half a dose or take only one dose prior to an office visit and test positive for the medication (Lowenthal, Briggs, Mutterperl, et al., 1975). Two additional problems inherent to biological monitoring deal with the metabolism of the patient and the half-life of the medication.

It is difficult to determine a patient's adherence or generalize findings between patients because each individual varies in the rate of absorption, metabolism and excretion of medications (Weintraub, Au, Lasagna, 1973). Additionally, many drugs do not exhibit a sufficiently long half-life for the drug to reach a "steady-state" to allow for the accurate assessment of its presence (Porter, 1969). Generally, direct biological monitoring should not be used as a sole measure of adherence. At best, biological monitoring can provide a simple yes-no measure of the presence of the drug.

Health care worker assessments are another measure of adherence that is commonly employed in formal clinic settings. This type of adherence measure is probably the least accurate, with ratings being little better than chance estimates. Studies have determined that health care workers' ratings tend to overestimate adherence by about 50% and correlate poorly with pill counts (Roth, Caron, 1978).

Self-monitoring with medication monitoring devices is a common type of adherence measure utilized in conditions with a long-term course. This type of monitoring has the advantage of providing the patient with immediate feedback allowing him/her to correct their perception of adherence and adjust their medication level without an office visit. Nevertheless, self-monitoring is subject to the

same behaviour patterns dictating medication adherence and, therefore, may be erratic among those that adhere poorly.

Pill counting probably provides a good quantitative assessment of the degree of adherence over time. If the health care worker knows the dosage, how many pills were available at the onset and how many pills remain at the time of measurement, the percentage of medication taken can be calculated for a specific time period. The reliability of this type of assessment seems to improve if the patient is unaware that he/she is providing their container of remaining medication to measure adherence. The pill count does not, however, provide the health care worker with an indication of the pattern of drug-taking. The addition of an interview to adherence measurement would allow you to identify persons taking their medication erratically.

Self reports of medication use during an interview is the most common type of adherence measure. Researchers have demonstrated that self-report of therapy adherence correlates better than biological measures to pill count assessment (Haynes, Taylor, Sackett, 1980). Diehl, Bauer, and Sugarek (1987) conclude that "rather than attempting to predict compliance from sociodemographic characteristics, symptoms, or biological values, the clinician should directly inquire about medication in a non-threatening way".

However, it can be argued that patients may under-report or over-report adherence. Patients may over-estimate adherence to please the health care worker, avoid displeasure, or in an effort to deemphasize personal medical problems (Dunbar, 1977). The fact that an interview forces a patient to rely on memory may produce under-reporting (Haynes, Sackett, Gibson, Et al., 1976).

It is clear from this discussion that relying solely on source of measurement to estimate adherence would not be optimal. What combination of techniques will provide the best estimate of adherence depends on the condition presenting in the patient, the type of treatment chosen and the personal and physical characteristics of the patient.

Conclusion

This paper has presented information for health care workers to utilize in their daily routine to enhance adherence to medical regimens among patients. By utilizing the DACMOB model to illustrate the cognitive and behavioural processes that lead to behaviour change, specific adherence modification techniques were identified at each





stage that can promote the adoption of skills that promote good adherence. The structure of behaviour modification presented in this paper is not fool-proof. It is presented only as a foundation. It is hoped that as you begin to integrate some of the ideas presented in this paper into your daily practice, you will become aware of subtle patterns of behaviour in your patients that will allow you to hone this foundation into a specialized programme that fits the individual needs of each patient.

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Figure 1. Prescription sheet for both literate and illiterate populations.

			
Name :			
Medicine :			
For :			
Dosage :			







This means 1/2 tablet 4 times a day

This means 1 capsule 3 times a day

This means 1/4 tablet twice a day

This means 2 teaspoons twice a day







			
			

Figure 2. Generic information sheet for the drug Tetracycline.

**TETRACYCLINES:
WIDE-RANGE ANTIBIOTICS
Tetracycline (tetracycline HCL, oxytetracycline, etc.
(Familiar name: Terramycin)**

Tetracyclines are broad-spectrum antibiotics; that is, they fight a wide range of different kinds of bacteria.

Tetracycline can be used for:
diarrhea or dysentery caused by bacteria or amoebas
sinusitis
respiratory infection (bronchitis, etc.)
infections of the urinary tract
skin infections
typhus
cholera
gallbladder infections

and other infections for which your doctor recommends it.
Tetracycline does no good for the common cold.

RISKS AND PRECAUTIONS:

Pregnant women should not take tetracycline after the fourth month, as it can damage or stain the baby's teeth. For the same reason, children under 6 years old should take tetracycline only when absolutely necessary, and for short periods only.

Tetracycline may cause diarrhea or upset stomach, especially if taken for a long time.

It is dangerous to use tetracycline that is "old" or has passed the expiration date. For the body to make the best use of tetracycline, milk should not be taken within 1 hour before or after taking the medicine.

For most infections, tetracycline should be continued for 1 or 2 days after the signs of infection are gone.

Always finish the prescription you have been given.

Figure 3. An example of an adherence contract.

ADHERENCE CONTRACT

Contract goal: (specific outcome to be attained).

I, (patient's name) agree to (detailed description of required behaviors, and length of time the behaviors must be preformed) in return for (detailed description of the rewards that are due upon completion of the required behaviors, and how the rewards are to be delivered).

I, (provider's name) agree to monitor the progress of (patient's name) and serve as a helper in the completion of the goal outlined above.

We will review the terms of this agreement, and will make any desired change on (date). We all agree to abide by the terms of the contract described above.

Signed: (Patient)_____ Signed: (Significant other)_____

Signed: (Provider)_____

Contract effective from (date)_____ to (date)_____.