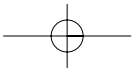
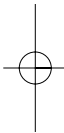
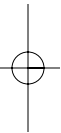


PART I

Introduction



1

Patient Adherence and Nonadherence to Treatments

An Overview for Health Care Providers

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Advancements in health care have yielded numerous effective medical and behavioral health treatments which, if administered correctly, can help patients live healthier, happier, and longer lives. However, all too often the benefits of these treatments are not fully realized because of patient nonadherence. Virtually all medical and behavioral health treatments require at least some degree of behavior change on the part of the patient (e.g., coming to appointments, picking up medications, agreeing to have assessments and procedures performed), and many treatments require significant behavior change (e.g., following demanding and complex medication regimens; making dietary, activity, or other lifestyle changes; enduring sometimes aversive behavioral interventions such as self-monitoring or exposure). Unfortunately, many

patients fail to make these behavior changes fully. In the medical treatment literature, rates of nonadherence to treatment have generally been found to be 20 to 40% for acute illness regimens, 30 to 60% for chronic illness regimens, and 50 to 80% for preventative regimens (Christensen, 2004). Nonadherence to treatment has also been found to be high in the psychotherapy and behavior therapy literature, with premature treatment dropout rates ranging from 30 to 60% (Garfield, 1994; Reis & Brown, 1999; Wierzbicki & Pekarik, 1993) and average rates of failing to complete assigned homework of roughly 50% (Detweiler & Whisman, 1999; Spiegler & Guevremont, 2003).

The consequence of this nonadherence to medical and behavioral health treatments is often that the beneficial impact of potentially effective treatments is reduced, and substantial

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and unnecessary health, social, and financial costs are incurred (Bryant, Simons, & Thase, 1999; Christensen, 2004; Cleemput, Kesteloot, & DeGeest, 2002; Reis & Brown, 1999; Rogers & Bullman, 1995). Health consequences can include no change or worsening of the health problem, the development of collateral health problems, the provider being unable to evaluate the effectiveness of the treatment (and potentially prematurely terminating or over-prescribing the treatment), and death of the patient.

Financial consequences of patient nonadherence can include the cost of additional services and treatment (e.g., additional visits, medications, and tests; emergency room visits, and hospitalizations), as well as decreases in the quality of life and work productivity of the patient. Poor adherence to prescribed medications, for example, is estimated to cost over \$100 billion each year in the United States through increasing health care use and decreasing patient productivity (Grahl, 1994).

Given that patient nonadherence is such a significant barrier to effective and efficient health care delivery, better understanding and addressing this problem is a crucial step toward improving patient care, outcomes, and treatment costs (e.g., Haynes, McDonald, Garg, & Montague, 2002). The purpose of this chapter is to provide a primer of the clinically relevant issues in the area of patient adherence, which are greatly expanded on in the subsequent chapters of this text. Specifically, this chapter will review definitions and types of adherence and nonadherence, methods of assessing adherence in clinical practice, factors associated with patient adherence and nonadherence, interventions to facilitate adherence, and conceptual issues and directions for future research in this area.

Definitions of Adherence and Nonadherence

Although there is much variability in the definition of the term *adherence*, it generally refers to the “*extent to which patients follow the instructions*

they are given for prescribed treatments” (Haynes et al., 2002, p. 2). In recent years, the term adherence has begun to be used in place of the more traditionally used term, *compliance*. This shift in terminology has occurred because many researchers and clinicians have believed that the term compliance suggests passivity and obedience on the part of patients, whereas the term adherence implies patient-provider collaboration and an active role of patients in their treatment (Rogers & Bullman, 1995). Nonadherence to treatments can take a number of forms:

- Not attending or coming late to appointments
- Not initiating a recommended treatment
- Not completing behavioral recommendations or homework (e.g., increases in physical activity, changes in diet, self-monitoring, in vivo exposure, relaxation exercises)
- Not taking medication as prescribed (e.g., taking too many or too few pills, taking medication at incorrect times, not following special dietary restrictions)
- Terminating the treatment prematurely

Clinical Assessment of Adherence

Clearly, an important component to addressing patient nonadherence to treatment is identifying its occurrence. With some aspects of treatment, the extent of patients' adherence can be directly observed by providers, such as with appointment attendance, in-session participation, or receiving provider-observed or -administered medication or procedures. However, most often providers do not have direct access to patients' adherence to treatment (e.g., following prescribed medication regimens, completing homework assignments, making changes in diet or exercise). In these cases, other methods of assessing patient adherence must be used.

There are a number of methods for measuring patients' adherence to treatment when it is not

directly observable to the provider. These include obtaining patient report, conducting pill counts and assessing pharmacy records, using medication event monitoring system (MEMS) caps and other electronic measures (e.g., pedometers), and assessing biological indicators (e.g., blood levels) and health outcomes. Each of these methods has its relative strengths and weaknesses in terms of reliability, validity, utility, and practicality, and there is no clear gold standard for measuring adherence across settings.

Patient report is the most commonly used method of assessing adherence in clinical practice because this method is relatively quick, easy, and inexpensive. Common methods of obtaining patient report data include questionnaires, daily self-monitoring diaries, and interviews. Although patient report is the most practical method of adherence assessment, the accuracy of this method is often reduced by patients' hesitancy to report nonadherence and by limitations in patients' ability to recall past adherence-related behavior, often resulting in under-reporting of nonadherence (e.g., Rand & Weeks, 1998).

Despite these limitations, patient report can be a valuable clinical tool and has been found to be a predictor of adherence and clinical outcomes (Rand & Weeks, 1998; Stone, 2001). Additionally, an important advantage of the patient report method is that it can provide information about the patterns and timing of treatment-related behavior as well as information about barriers to adherence. This can be particularly the case when patients use daily self-monitoring diaries to record the time of day of their treatment-related behaviors (e.g., medication taking, diet, behavioral activation, homework) as well as reasons for nonadherence. Methods that can increase the accuracy of patient self-report of adherence include the following: using brief, structured questionnaires; asking patients to report on levels of nonadherence rather than on levels of adherence; specifying a specific time frame; assessing a recent time frame (e.g., the last 4 days); using cues to facilitate recall; having patients use a daily diary to record treatment-related behavior; and

reassuring patients that problems with adherence are normal, they will not be punished for nonadherence, and that accurate reporting of adherence problems is crucial for effective treatment (Andrews & Friedland, 2000; Dunbar-Jacob, Burke, & Puczynski, 1995; Rabkin & Chesney, 1999; Stone, 2001; Vitolins, Rand, Rapp, Ribisl, & Sevick, 2000). Chapter 2 of this volume provides further discussion of the use of patient self-report and other methods of assessing adherence in clinical settings, and also reviews in detail commonly used methods of assessing adherence in research settings.

Factors Related to Patient Nonadherence to Treatments

Because patient nonadherence has been found to be a significant barrier to effective health care delivery, there has been great interest in understanding the causes of this problem. Over the last several decades, hundreds of studies have been conducted in this area, and a wide range of factors have been found to be associated with adherence and nonadherence to treatments. This work has been an important step toward helping clinicians and researchers begin to better understand the nature of adherence and develop interventions to improve it. Table 1.1 summarizes clinically relevant factors that have empirical support for their association to nonadherence to treatments. In this table, factors have been organized into those related to (1) the patient, (2) the treatment, (3) the patient-provider relationship, (4) the clinical setting, and (5) the target problem or disease, because this can be a useful way of conceptualizing barriers to treatment adherence (Ickovicks & Meisler, 1997).

Although progress has been made in better understanding the nature and causes of nonadherence, much work remains to be done. To date, it has been difficult to make clear conclusions from the literature as to the specific factors or sets of factors that are the most significant determinants of patient nonadherence as well as

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Table 1.1 Factors Related to Nonadherence to Treatments

Factors related to the patient

Lack of knowledge of treatment requirements
 Cognitive, language, or literacy deficits
 Lack of self-management and coping skills (e.g., self-control, problems solving)
 Lack of tangible resources (e.g., financial, housing, transportation, time)
 Stressful life events (e.g., death of loved one, ending of important relationship)
 Problematic health and treatment-related beliefs (e.g., regarding need for treatment, seriousness of the health problem, efficacy of the treatment, relative costs and benefits of adhering, and adherence self-efficacy)
 Mental health problems (e.g., depression, substance abuse, and psychotic symptoms)
 Inadequate social support (e.g., emotional and instrumental support; reminder and encouragement of adherence)
 Low motivation, apathy, or pessimism about health and future
 Problematic past experiences with adherence (e.g., adverse effects, difficulty with adherence)
 Fear of stigma for health problem
 Treatment is an unwelcome reminder of illness
 Problematic responses to slips in adherence

Factors related to the treatment regimen

High complexity and demands of the treatment (e.g., large number of pills to take, complex time-consuming homework assignments, substantial change in daily activities or diet)
 Poor fit between treatment requirements and patient's lifestyle and daily activities (e.g., eating and sleeping patterns, work schedule, social life, other daily activities)
 Long duration of the treatment
 Frequent and severe side effects
 High cost of treatment

Factors related to features of the disease or target problem

Health problem not serious or threatening to health
 Long-term duration of health problem
 Lack of symptoms or related problems experienced by patient
 Symptoms of health problem interfere with adherence (e.g., problems with memory, mobility, or vision)

Factors related to the patient-provider relationship

Poor communication between patient and provider
 Provider does not adequately assess problems with treatment and/or adherence
 Patient has difficulty discussing problems with treatment and/or adherence
 Patient uncertain about provider's ability to help
 Patient lacks trust and/or comfort with provider
 Patient and provider have differing conceptualizations or expectations of problem and/or treatment

Factors related to the clinical setting

Poor accessibility of services (e.g., availability of appointments/staff, hours of operation, waits for services)
 Lack of continuity or cohesiveness of care
 Unfriendly or unhelpful staff

NOTE: For recent detailed discussions of these factors and their empirical support see the following: Christensen (2004); DiMatteo (2004); Myers and Midence (1998); Roter et al. (1998); Scheel, Hanson, and Razzhavaikina (2004); Shumaker, Schron, Ockene, and McBee (1998); Vermeire, Hearnshaw, and Van Royen (2001); World Health Organization (2003).

the way in which factors interact to affect adherence. This has been partly because there have been wide variations across studies in definitions and measurements of examined factors as well as in the definitions and measurements of adherence. Additionally, factors that have been identified as related to adherence have generally accounted for small to moderate proportions of the variance in adherence and are not consistently related to adherence across comparable studies. For these reasons, using commonly identified barriers to predict whether any one patient will adhere has been, generally, unsuccessful (for reviews see Burke & Ockene, 2001; Christensen, 2004; Dunbar-Jacob & Mortimer-Stephens, 2001; Fincham, 1995; Ickovics & Meisler, 1997; Meichenbaum & Turk, 1987; Morris & Schulz, 1992; Myers & Midence, 1998; Pampallona, Bollini, Tibaldi, Kupelnick, & Munizza, 2002; Reis & Brown, 1999; Scheel, Hanson, & Razzhavaikina, 2004; Shumaker, Schron, Ockene, & McBee, 1998; Vermeire, Hearnshaw, & Van Royen, 2001; World Health Organization, 2003). A number of theoretical models have been developed to aid in the understanding and prediction of adherence- and nonadherence-related behaviors. However, to date these models have been relatively unsuccessful at meeting these goals (see Christensen, 2004).

Several important themes do emerge from this literature. First, as pointed out by Meichenbaum and Turk (1987), although these factors are listed in Table 1.1 as though each is a discrete construct, many are likely to be somewhat overlapping and should not be thought of as completely independent. Second, despite these overlaps, treatment adherence appears to be complex and multidetermined. Many different types of factors likely affect patients' adherence, including factors relating to the patient, disease/target problem, treatment, provider, and clinical setting/health care system. This is important to note because the common practice of focusing solely on the patient-related factors when considering barriers to adherence and interventions to improve it can neglect the often significant impact of other determinants. Third,

patients appear to be quite heterogeneous in terms of if and how any of these factors affect their adherence. Specific barriers are present for some patients and not for others (e.g., organizational problems, depression, problematic treatment-related beliefs), and for patients who do encounter specific barriers, some have adherence problems as a result of the barriers and some do not. Fourth, barriers to patients' adherence do not tend to be static. Rather, patients' adherence barriers will likely change over time. As will be discussed later in this chapter, the important implication of this is that adherence and adherence barriers need to be assessed regularly. And finally, given the high rate of patient nonadherence, and given the fact that a reliable method of predicting whether or not any one patient will adhere is yet to be developed, it is best to assume that *every* patient is at risk for nonadherence.

Putting these themes together suggests that improving patient adherence should involve conducting thorough and regular assessments of potential barriers to adherence for each patient and then developing tailored interventions that address these identified barriers. This will require an understanding of the potential barriers to patient adherence as well as the development of methods for reliably assessing these for a given patient. Despite the limitations of the barriers-to-adherence literature discussed above, it can serve to facilitate this process by orienting clinicians to potential barriers to patients' adherence as well as to potentially effective interventions. See Chapter 4 of this volume for further discussion of how this can be done systematically.

Interventions for Increasing Patient Adherence to Treatments

The problem of patient nonadherence to treatments has also produced a great deal of interest in the development and evaluation of methods for improving adherence. However, as is the case

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with the literature on factors relating to nonadherence, the literature on the effectiveness of interventions is somewhat unclear. This is partly because a relatively small number of studies have been conducted examining adherence interventions (for reviews of this literature, see Burke & Ockene, 2001; Christensen, 2004; Dunbar-Jacob & Mortimer-Stephens, 2001; Dunbar-Jacob & Schlenk, 1996; Falvo, 2004; Fincham, 1995; Haynes et al., 2002; Ickovics & Meisler, 1997; McDonald, Garg, & Haynes, 2002; Meichenbaum & Turk, 1987; Mullen, Green, & Persinger, 1985; Myers & Midence, 1998; Pampallona et al., 2002; Roter et al., 1998; Scheel et al., 2004; Shumaker et al., 1998; Vermeire et al., 2001). Additionally, many of these studies have been limited by methodological and other problems that have made interpreting their results difficult, including the use of measures of adherence that have problematic validity; a lack of random assignment or control groups; confounding variables; small sample sizes; short follow-up periods; a lack of detailed descriptions of the interventions; and differing definitions of adherence across studies. Matters have been complicated further because many studies have evaluated interventions that have consisted of multiple components as opposed to stand-alone techniques or strategies, making it difficult to identify specific strategies that may be most effective, and methodologically sound studies of similar interventions have produced different outcomes (e.g., Haynes, Wang, & Da Mota Gomes, 1987).

Despite the limitations of this research, the literature has produced some useful guidelines and information regarding the effects of adherence interventions. A detailed description of all the strategies included in adherence interventions that have support for their efficacy is well beyond the scope of this brief chapter. However, the primary strategies that have garnered empirical support as stand-alone interventions or as part of multicomponent interventions are summarized in Table 1.2.

Several considerations in interpreting this literature should be noted. First, the majority of

research in this area has focused on improving adherence to medical treatments, particularly focusing on medication regimens and keeping appointments. Second, as discussed earlier, strong conclusions regarding the extent and relative efficacy of any one of these interventions or strategies are limited by the problems in the literature described above. Third, a number of these interventions and strategies are somewhat overlapping and, therefore, any one should not necessarily be considered as discrete and independent from another.

In summarizing this literature, a number of important observations can be made. First, effective interventions have been delivered through a range of modes (e.g., face to face contact, phone, and mail), by a range of providers (e.g., physicians, nurses, adherence counselors, mental health providers, and computers), with a range of adherence targets (e.g., medication regimen adherence, appointment keeping, treatment retention, and behavioral assignments), and with a range of patient populations (e.g., patients with chronic and acute medical and mental illness, patients in need of preventative health treatment). Second, no single adherence-promoting strategy appears to be clearly most effective across patients, conditions, and clinical settings. However, interventions found to significantly improve adherence generally include educational, social support, cognitive-behavioral, and/or behavioral components. Third, multicomponent interventions are generally more effective than single-strategy interventions, and interventions that involve multiple sessions or follow-ups tend to be more effective in sustaining adherence over time than one-time interventions. Fourth, the impact of these interventions has been generally modest, with effect sizes rarely exceeding more than .34. These findings taken together are consistent with the notion that adherence involves a complex, multidetermined, and dynamic set of behaviors and circumstances that are not easily changed (for reviews of this literature, see Haynes et al., 2002; Malouff & Schutte, 2004; Morris & Schulz, 1992;

Table 1.2 Strategies for Increasing Patient Adherence to Treatments*Assessing readiness to begin treatment*

Assessing past adherence patterns and current beliefs and concerns about the treatment
 Discussing pros and cons of initiating treatment
 Asking patient to rate confidence in carrying out treatment
 Identifying potential barriers to treatment

Increasing treatment-related knowledge

Educating patient

- Nature of health problem and action of the treatment
- Specific behavioral requirements of the treatment (what, where, when, and how)
- Importance of adherence
- Nature and management of likely aversive effects of treatment (e.g., side effects)

Using simple, understandable language

Using visual aids

Providing all information in written form

Assessing comprehension

Having patient demonstrate proficiency

Increasing adherence skills

Providing information on treatment-related aids and training in their use

- Using cues for engaging in treatment behaviors (e.g., alarms, notes, and stickers)
- Linking treatment behaviors to daily activities such as morning and bedtime routines, meals, television shows, etc.
- Self-monitoring (e.g., tracking treatment-related behaviors)
- Using medication organizers (e.g., pill boxes), special medication packaging (e.g., blister packaging)

Teaching how to integrate treatment into routines

Teaching skills in anticipating, avoiding, and managing slips in adherence

Teaching problem-solving skills

Teaching skills for communicating with providers (e.g., asking questions, reporting problems)

Using role-playing behavioral rehearsal

Increasing resources and support

Referring to social services or social worker for assistance with accessing resources (e.g., financial, housing, transportation, child care)

Reminder calls and letters

Increasing social support, including

- Increased support and help with adherence from friends or family
- Increased contact with staff (additional appointments, telephone “check-ins,” home visits)
- Support groups or individual counseling

Increasing motivation

Maintaining warm, empathetic, genuine, collaborative, nonconfrontational stance

Having patient take an active role in treatment planning and decisions

Making treatment recommendations as behaviorally specific as possible

Simplifying treatment as much as possible to match patient capabilities

Tailoring treatment to fit patient’s lifestyle, therapy goals, natural reinforcements

Helping patient reduce or manage identified barriers and aversive effects of treatment (e.g., side effects)

(Continued)

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Table 1.2 (Continued)

Enhancing patient's self-efficacy (e.g., pointing out past successes and successes of similar patients; affirming patient's ability to adhere)

Helping patient to reframe problematic health beliefs and beliefs about the treatment

Getting firm commitments from patient regarding specific treatment-related behaviors

Having patient self-monitor adherence and treatment progress

Establishing a reinforcement system for adherent behavior (e.g., self-reinforcement; praise from staff, friends, or family; financial or other tangible reinforcements such as vouchers)

Orienting patient to benefits of adherence and costs of nonadherence (e.g., on health, treatment goals, future goals), using adherence- and health-related feedback

Treating mental health problems (e.g., depression, substance abuse)

Minimizing barriers at clinic (e.g., long waits, limited appointment times)

Having continuity of patient care at clinic

Using therapy and behavior change preparatory techniques such as treatment contracting, role induction, vicarious therapy retraining, experimental pretraining, and motivational interviewing (see Lash and Burden, in press; Walitzer, Dermen, & Connors, 1999; Zweben & Zuckoff, 2004)

Maintenance

Having regular follow-up visits with patient

Regularly assessing adherence

Regularly assessing barriers to adherence helping patient to reduce, manage, or otherwise overcome these barriers

NOTE: For more detailed discussions of these strategies as well as their empirical support see the following sources: Burke and Okene (2001); Christensen (2004); Dunbar-Jacob and Mortimer-Stephens (2001); Dunbar-Jacob and Schlenk (1996); Falvo (2004); Fincham (1995); Haynes, McDonald, and Garg (2002); Heiby and Lukens (Chapter 4, this volume); Helmus, Saules, Schoener, and Roll (2003); Ickovics and Meisler (1997); Kirschenbaum and Flanery (1983); Lash and Burden (Chapter 19, this volume) Malouff and Schutte (2004); McDonald, Garg, and Haynes (2002); Meichenbaum and Turk (1987); Mullen, Green, and Persinger, (1985); Myers and Midence (1998); Pampallona et al. (2002); Roter et al. (1998); Scheel, Hanson, and Razzhavaikina (2004); Shumaker, Schron, Ockene, and McBee (1998); and Vermeire, Hearnshaw, and Van Royen (2001).

Pampallona et al., 2002; Roter et al., 1998; Scheel et al., 2004; Walitzer, Dermen, & Connors, 1999; World Health Organization, 2003).

A number of other important themes emerge from this literature that map on well to the topics discussed in the chapters of this volume. First, "patient readiness" and motivation to adhere to a treatment appear to be important considerations when beginning a treatment or attempting to improve patient adherence and should be addressed (see Chapters 3 and 5 for discussions of these issues). Second, it appears that adherence interventions may be most effective if tailored to the specific demands of each treatment and the identified barriers and needs of each

patient (see Chapter 4 for guidelines on how to do assessment-based tailored adherence interventions, and see Chapters 12 to 29 for discussions of special considerations in facilitating adherence to specific treatments and with specific patient populations). Third, patient adherence is affected by specific behaviors (or lack of behaviors) of providers as well as the structure and contingencies of the health care system, including the continuity of the care within the system. This is an important theme in that it can orient providers and administrators to making behavioral and systemic changes to promote adherence rather than assuming that it is only patients that need to change. In each chapter of this text are

examples of how this can be done in different clinical settings with a variety of different treatments and patient populations. Fourth, providing treatment and adherence-related information to patients effectively is often important, but not typically sufficient, to facilitate adherence (see Chapter 6), as is the case with increasing patients' adherence-related resources and social support (see Chapter 8). Fifth, much of adherence interventions involve adherence-related skill building. It can be very useful to think about adherence as a "skill to be learned." Taking this perspective reduces patient and provider judgments about nonadherence and also orients both to approach nonadherence as a problem to be solved rather than an unchangeable trait of the patient (see Chapters 7, 9, and 10). Sixth, regularly following up with patients on their adherence (and barriers to adherence) is critical to improving it.

Conceptual Issues in Understanding and Facilitating Treatment Adherence

One of the problems associated with understanding and making progress in treatment adherence is that it is a very complex construct. Some philosophers of science such as Laudan (1977) have recognized that science has both conceptual and empirical problems. Psychologists can easily recognize the latter but at times have more difficulty recognizing the former. Conceptual problems are important to recognize because progress on these may be necessary before substantial empirical progress can be made. There are clear examples of conceptual problems in science, such as definitions of species in biology or mass in physics. In psychology, certainly, some conceptual problems are recognized, such as what "abnormal behavior" or a "mental disorder" is and is not (Szasz, 1960), or more specifically, what the criteria of certain diagnostic categories should be (O'Donohue & Elliot, 1992).

The construct of treatment adherence is complex for a number of reasons. First, it denotes a wide variety of actual behaviors. It can involve a single discrete episode of behavior, such as coming for a one-time procedure on Friday at 9:00 a.m., or behaviors that occur over a lifetime, such as exercising three times a week for 45 minutes or taking medication three times a day for the rest of a patient's life. Second, the behaviors involved in adherence can range from simple and discrete and of the same response class, such as taking one pill each day, to complex and involving multiple kinds of behavior, such as taking one pill, pricking the finger and performing a glucose test, checking the feet, limiting sugar intake, and exercising each day. Third, the behaviors involved in adherence can involve increasing behavior, such as eating more fiber, or reducing behaviors, such as eating less fat. Fourth, the behaviors can involve contrary motivational systems, such as quitting smoking or taking a medication which brings about adverse side effects such as nausea, or consistent motivational systems, such as taking medications that reduce symptoms of illness and have no side effects. Fifth, the behaviors can be relatively easy to understand and perform, such as simple pill taking; or very complex and demanding, such as with HIV medication, which often involves taking multiple medications at different times of the day as well as other special instructions (e.g., dietary restrictions). Sixth, the patient can be ideally suited to comply (e.g., adult, cognitively sound, motivated, good organizational skills, and self-control), or not ideally constituted for adherence (e.g., cognitive or motivational limitations). Seventh, the psychological meaning of the treatment can be complex, such as in the case when the patient is embarrassed about the health problem or the patient has a poor relationship with the provider and/or caregiver.

This heterogeneity will likely produce heterogeneous responses to the problem of treatment adherence. Because treatment adherence covers so much ground, empirical strategies to understand and improve specific regimens will

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necessarily cover a lot of ground also. It would be useful to determine if a principle-based subtype can be discovered to deal with this complexity and heterogeneity. There are two possibilities concerning this: (1) that a few principles, such as self-control, organizational skills, education, and so on, will be so powerful that they will have a large, wide effect across all or most facets of treatment adherence or (2) that there will be different principles, albeit with some overlap across different domains. For example, organizational skills may be most important for complex medication dosages, whereas social support may be more important with an oppositional adolescent. More modeling and research is needed to determine what sort of personality characteristics and mental disorders (even common low level problems such as depression) affect the probabilities of adherence to different adherence tasks. These are important empirical questions, but empirical questions best answered with these sorts of distinctions in mind.

Directions for Future Research

Patient nonadherence to treatment continues to be a significant barrier to effective health care delivery, and the literature on the effectiveness of interventions to improve adherence is fairly inconclusive. More work is certainly needed in this area. First, continued efforts are needed in the development and testing of models of adherence and nonadherence that will facilitate understanding and prediction of adherence as well as guide the development of effective interventions. It is likely that researchers will need to start thinking more “outside the box” to accomplish this. It might also be the case as alluded to above that adherence is not one single problem but a variety of problems. It might mirror Gordon Paul’s question of psychotherapy outcome research, “What intervention, delivered by what kind of professional, to what kind of

patient, with what kind of problem, produces what kind of effects, under what circumstances?” This kind of question might suggest that adherence is actually a multitude of somewhat related problems rather than a single problem as the single noun “adherence” denotes. Second, further work is needed in developing and testing valid and reliable methods of assessing adherence to treatments. This should include the development of technologies for assessing adherence as well as methods for integrating these into clinical practice. Cost and convenience are key parameters, but unfortunately these usually involve trade-offs with validity. In addition, it might be that treatment nonadherence should be assumed rather than detected later and become part of the standard treatment. Third, existing interventions, as well as new and innovative interventions, need to be tested using sound methodology that will enable the determination of what interventions are effective. Specifically, more outcome studies need to be conducted that use valid and reliable measures of adherence, use random assignment to a control group, lack significant confounding variables, have adequate sample sizes (e.g., >60 subjects per group), have longer follow-up periods (e.g., >6 months), provide detailed descriptions of the interventions, and use standardized operational definitions of adherence (so outcomes can be compared across studies). These studies should also report titration results in which levels of treatment outcome are shown as a function of levels of adherence. This will allow determination of the degree of adherence that is necessary. Fourth, as this line of adherence research develops, conducting outcome studies on what interventions and combinations of interventions are best for specific populations and treatments could be extremely clinically useful as well as potentially cost-effective. Finally, for nonadherence assessments and interventions that are found to be effective, provider training and dissemination methods need to be developed and evaluated.

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