Adherence to Treatment

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Published online on: 18 Dec 2018
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For people diagnosed with a long-term condition, optimal use of prescribed medications aligned with evidence-based guidelines is necessary to achieve the best possible therapeutic effect and health outcomes. However, adhering to the medication regimen recommended by healthcare professionals is often difficult and many people do not take their medicines as prescribed. Adherence is defined by The World Health Organisation (WHO) as ‘the extent to which a person’s behavior—taking medication, following a diet and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider’ (Sabaté, 2003). WHO estimates that between 30% and 50% of medicines prescribed for long-term conditions are not taken as recommended (Sabaté, 2003). However, there is wide variation in adherence rates across studies (Nieuwlaat et al., 2014).

The prevalence of long-term conditions is high and will only increase with an aging population. In the United States, 117 million people, approximately half the adult population, have a long-term condition (Ward, Schiller, & Goodman, 2014). Medication nonadherence is associated with poor health outcomes, which is a significant burden on healthcare providers (Nunes et al., 2009). The commitment to fully understanding nonadherence and developing interventions to improve adherence is vital for future healthcare provision. In this chapter we describe the issues relevant to research in medication adherence and outline the predominant approach and health psychology theory that underpins explanations of nonadherence and informs the development of effective interventions. Providing a comprehensive summary of different illness groups is beyond the scope of this chapter. Instead, we will refer to asthma as an exemplar long-term condition to contextualize this overview.

Ethical Issues

There is an important context in which to evaluate treatment adherence, and that is shared decision making (see Chapter 12). The dominant theme in the US, the UK and many healthcare systems globally, is for treatment recipients to be active partners in decision making about their care (Nunes et al., 2009). In shared decision making, clinicians are encouraged to engage in a discussion about treatment options and increase recipients’ involvement in treatment decisions. In most cases the primary goal of medicine should be to enable an informed decision on the part of the individual. Once this has been achieved, interventions to support adherence are more ethically appropriate. These issues are discussed in more detailed elsewhere (Chapter 12; Horne, 2017; Horne & Weinman, 2004; Horne et al., 2005).
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Why Adherence Interventions Fail

Numerous interventions aimed at improving treatment adherence have been evaluated, yet many are ineffective (Haynes, Ackloo, Sahota, McDonald, & Yao, 2008; Nieuwlaat et al., 2014). Explanations for this lack of effectiveness vary. Design limitations, particularly if a study is underpowered, can prevent an effect being established (a statistical Type II error) regardless of the potential effectiveness of the intervention. Inadequate descriptions of the specific intervention ingredients may lack scientific rigor and prevent replication accuracy. Further, some interventions are not informed by clear evidence that the potentially modifiable factor can be targeted or interventions are not adequately tailored (Horne, 2006). There has been a tendency for interventions to focus on practical support to enable adherence by helping people overcome barriers, e.g., providing reminders, simplifying the medication regimen or providing clearer instructions. This is helpful, but limited in its effectiveness as most only address one aspect of adherence, the practical ability to adhere and not the individual’s motivation to do so.

Interventions that support adherence are likely to be more effective if they adopt the Perceptions and Practicalities Approach (PAPA), where support is tailored to address the specific perceptions influencing both motivation and ability (Horne, 2006) as recommended in the UK’s National Institute for Health and Care Excellence (NICE) Medication Adherence guidelines (Nunes et al., 2009). For the remainder of this chapter, we consider this approach in more detail and outline how health psychology theory can help us to understand the potential determinants of adherence from the perspective of the individual and how this informs the design of innovative interventions.

Individual Motivation and Ability as Fundamental Determinants of Adherence: The Perceptions and Practicalities Approach

The Perceptions and Practicalities Approach (PAPA) (Horne, 2001; Horne et al., 2005) offers a simple framework to guide the development and appraisal of adherence-promoting interventions. It attempts to specify the ‘minimum ingredients’ of adherence support targeted to the needs of the patient. PAPA focuses on how individuals interact with their treatment, and derives from the basic premise that two key attributes that are considered essential for adherence: motivation and ability.

The focus on the individual is justified because nonadherence can rarely be understood in terms of trait characteristics or sociodemographic factors. Relationships between these non-modifiable characteristics and adherence are neither consistent nor clear. Adherence is best conceptualized as a variable behavior rather than a trait characteristic: Adherence rates vary not just between individuals but also within the same individual over time and across treatments (Horne et al., 2005). For example, in asthma, gender has been shown to be associated with inhaled corticosteroid adherence (ICS) in children, with one study, for example, reporting that girls have on average 12% higher adherence than boys (Chan et al., 2016). However, in other studies, no relationship between gender and adherence is found (Van Dellen, Stronks, Bindels, Öry, & Van Aalderen, 2008). These seemingly contradictory associations have been reported with other similar sociodemographic determinants such as income, length of diagnosis and condition severity.

These and other findings suggest that, although a wide variety of intrinsic factors (e.g., gender, age, depression and anxiety) and extrinsic factors (e.g., sociodemographic factors, environmental opportunities and constraints) are relevant, their effect on adherence is likely to manifest through individual attributes.

Motivation and Ability: Essential Intrinsic Attributes for Adherence

In common with many behaviors, nonadherence may be both intentional (e.g., when we decide not to take the treatment or to take it in a way which differs from recommendations) and/or
unintentional (e.g. when we want to follow the recommendations but are prevented from doing so by barriers that are beyond our control). If we begin with the individual, the minimum requirement for explaining variation in adherence/nonadherence is the interaction between two factors: motivation and ability (Horne et al., 2005). Motivation may arise from both conscious decision-making processes and more instinctive, intuitive processes (Kahneman, 2011). Likewise, a range of factors influences ability (e.g. knowledge and physical capability to administer the dosage form on time) (Horne et al., 2005; Piette, Heisler, Horne, & Alexander, 2006). These two aspects of motivation and ability form the fundamental basis of the PAPA framework, depicted in Figure 11.1.

Motivation and ability are shown as overlapping circles, because they are interrelated. For example, motivation may arise from intentional decision making, but can also be more instinctive and intuitive (unintentional) (Kahneman, 2011). An individual may be more likely to forget a medication (unintentional process) if they do not perceive the medication to be necessary or important for their health (intentional process). Among children with asthma, inhaler technique training (a process of imparting ability) was more effective among those who were more motivated to practice the inhaler technique (Ovchinikova, Smith, & Bosnic-Anticevich, 2011). Likewise, interventions that make medication-taking easier (e.g. by simplifying the dosing regimen to once daily—therefore increasing ability to adhere) can lead to increased motivation to take the medication (van Dulmen et al., 2007).

Interestingly, the two concepts of motivation and ability may not necessarily relate to adherence in a linear consecutive fashion. Although in most cases, increasing motivation and or ability precedes the action (adherence), in some cases, performing the action (medication-taking) might increase motivation, leading to further action. For example, in some individuals, the action of taking the medication may stimulate motivation to keep taking the medication if this results in feeling better after taking the treatment.

The two overlapping circles shown in Figure 11.1 act as a basic aide-memoire for designing or evaluating an adherence intervention. The first step is to consider whether the intervention takes account of both perceptions and practicalities influencing the individual’s motivation and ability to adhere and whether support is then tailored to address each of these factors. As such, the PAPA framework is not intended as a comprehensive theory. There are many other factors that need to be considered if...
we are to map the antecedents of adherence and nonadherence. Rather, the two overlapping circles suggest the ‘core’ attributes of the individual determining adherence/nonadherence. This might serve as a foundation for more comprehensive modeling of determinants as discussed previously (Horne, 2006; Horne et al., 2005). We will return to this later.

Opportunities and Triggers

Although motivation and ability are essential intrinsic factors determining adherence/nonadherence these may be influenced by factors that enable the behavior or prompt it, particularly opportunity and triggers. The concept of opportunity was first recognized in the Motivation-Opportunity-Abilities (MOA) model (ThØgersen, 1995) and later by Michie et al. in their COM-B model, where the behavioral determinants are labeled Motivation, Opportunity and Capability (Michie, van Stralen, & West, 2011; see also Chapter 6). Triggers can be external prompts (e.g. a pill reminder alarm) or internal calls to action such as the experience of symptoms prompting taking medication to allay them. The importance of triggers is recognized in Fogg’s behavioral model, comprising Motivation-Abilities-Triggers (Fogg, 2009).

Examples of increasing treatment opportunity in adherence would include funding or subsidizing a medication, or improving ease of access to the treatment, for example by delivering medication to an individual’s home. These opportunities can improve adherence by enhancing motivation and ability (Taira, Wong, Frech-Tamas, & Chung, 2006). Similarly, triggers such as parental reminders for children to take asthma medication or cell phone or app-based reminders can improve adherence by improving an individual’s ability to take treatment on time (Chan et al., 2015; Petrie, Perry, Broadbent, & Weinman, 2012).

Whether opportunity and triggers work to improve adherence, however, ultimately depends on how they impact on the individual’s intrinsic motivation and ability. For example, making a medication freely available may still not improve adherence if the individual remains concerned about treatment side effects. Likewise, an external reminder may not trigger adherence if the individual is unconvinced about the need for the medication or has concerns about taking the medication, and so is not motivated to take the treatment in response to the trigger. A reminder designed to trigger medication use may actually reduce motivation to take the medication if the individual finds the reminder intrusive or annoying (Mannheimer et al., 2006). Ideally, adherence interventions should target both motivation (e.g. by impacting on perceptions and beliefs) and ability (e.g. by enhancing medication-taking skills and capability) and approaches may target the individual and the environmental factors that might be affecting their motivation and/or ability (Horne et al., 2005). Addressing motivation and ability is also a precursor to the formation of an adherence habit, where taking treatment becomes automatic and part of the individual’s routine.

The PAPA framework emphasizes the importance of the person’s perceptions and beliefs as fundamental determinants of adherence/nonadherence. But what beliefs are particularly salient for adherence? We can draw on health psychology theories to answer this question. Several theoretical approaches have been developed to conceptualize the key variables determining volitional health behaviors such as adherence to treatment. A review of these models is beyond this chapter and can be found elsewhere (Holmes, Hughes, & Morrison, 2014; Horne & Weinman, 1998). Here we present a specific theoretical framework that focuses on the individual representations of treatment and illness as fundamental drivers of nonadherence.

Common-Sense Model of Self-Regulation

The Common-Sense Model (CSM; Leventhal, Diefenbach, & Leventhal, 1992; Leventhal, Leventhal, & Contrada, 1998) was developed to explain variations in health- and illness-related behavior.
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The CSM focuses on understanding the individual’s motivation to respond to health threats and maintain well-being. It is a dynamic model that incorporates both cognitive and emotional processes and assumes that people are active problem-solvers, interpreting the problem, coping with the problem, and (re)appraising the coping strategy. An individual’s cognitive representations of the health threat on the dimensions of identity, causes, timeline, control and consequences are formed from various sources (doctors, family, friends or media) as well as their own personal experiences. These representations influence emotional and behavioral responses to health threats such as potential consequences of not managing prescribed treatment. An appraisal of the response might then lead to an altered cognitive representation of the threat and potentially lead to further altered emotional and behavioral response. CSM constructs differ from those in the HBM and TPB models as they are ‘multi-level’ and more tangible than the abstract form offered by HBM and TPB (Leventhal, Phillips, & Burns, 2016).

The CSM has been used in several studies to explore nonadherence across different long-term conditions with varying support for elements within the model but lacks explanatory value overall (Holmes et al., 2014). However, a related branch of work has focussed on representations of treatment as more proximal determinant of adherence. This approach applies Leventhal’s notion of cognitive and emotional representations of illness as key determinants of behavior but extends the focus to treatment presentations.

**Representations of Treatment as Key Determinants of Engagement and Adherence**

To understand treatment, we need to look beyond illness representations to consider beliefs about treatment. Empirical studies have typically not shown a strong relationship between illness beliefs and medication adherence (Aujla et al., 2016). This might be because treatment beliefs are more proximal to adherence than illness beliefs (Horne, 2003). Patients’ beliefs about medicines have been quite extensively studied, usually in the context of explaining variations in adherence to prescribed treatments. Early studies delineated two types of beliefs: general beliefs about pharmaceutical medicines as a class of treatment versus specific beliefs about the particular type of medicine under consideration (Horne, Weinman, & Hankins, 1999).

**General Beliefs About Medicines and Pharmaceutical Schema**

When asked for their views about pharmaceutical medicines, people seem to draw on beliefs relating to medicines as a class of treatment sharing certain general properties (Britten, 1994), often perceiving them to be fundamentally harmful, addictive substance that should not be taken for long periods of time that tend to be over-prescribed by doctors (Horne et al., 1999). The dangerous aspects of medication are often linked to their ‘chemical’ or ‘unnatural’ origins and to suspicions of the pharmaceutical industry (Britten, Riley, & Morgan, 2010; Horne et al., 1999).

Negative views about medicines in general appear to be related to a broader ‘worldview’ characterized by suspicion of chemicals in food and the environment (Gupta & Horne, 2001), and the perception that complementary therapies (e.g. homeopathy/herbalism) are more ‘natural’ and therefore safer than medicines (Green, Horne, & Shephard, 2013; Horne et al., 1999). This coincides with an increasing suspicion of science, medicine and technology within Western cultures (Faasse, Cundy, & Petrie, 2009; Petrie et al., 2005). There is evidence that general beliefs about medicines may vary across cultural and ethnic groups within the UK (Horne et al., 2004; Kumar et al., 2008). However, variation within cultural groups is likely to be greater than between groups (Horne et al., 2004).

People also vary in their perceptions of personal sensitivity to the effects of medicines. Those with stronger perceptions of personal sensitivity have more negative views about pharmaceutical
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medicines and vaccination and to be more reluctant to take medication or receive vaccinations (Horne, Faasse, et al., 2013). Beliefs about medicines in general combined with beliefs about self in relation to medicines can be thought of as ‘pharmaceutical schema’, or how ideas about pharmaceuticals are organized. Negative pharmaceutical schemas are linked to wider concerns about scientific medicine and may influence preferences for treatments (e.g. medication versus natural remedies) (Calnan, Montaner, & Horne, 2005; Green et al., 2013).

General pharmaceutical schema influence how we evaluate specific treatments prescribed for us pharmaceutical medicines. Negative pharmaceutical schemas are associated with greater concerns that specific medication will result in harm and with greater doubts about the necessity for treatment (Chapman, Horne, Chater, Hukins, & Smithson, 2014). They influence the processing of information about the benefits and risks of a specific treatment. In laboratory studies, those with negative pharmaceutical schema were more likely to think that an unrelated symptom was caused by a prescribed medicine (Heller, Chapman, & Horne, 2015) and less likely to recall side effects information correctly (Heller, Chapman, & Horne, in press).

Evaluating Prescribed Medicines: The Necessity-Concerns Framework

The motivation to start and persist with prescribed treatment regimens is influenced by perceptions of personal need for the treatment ‘necessity belief’ relative to concerns about potential adverse consequences of taking it as recommended (Horne, Cooper, Gellaitry, Date, & Fisher, 2007). A recent meta-analysis of 94 studies covering 23 long-term conditions in 18 countries showed that adherence to medication prescribed for long-term conditions is often related to necessity beliefs and concerns (Horne, Chapman, et al., 2013).

Common Sense Evaluations of Treatment Necessity

Necessity beliefs might be thought of as the answer to two questions: ‘How much do I need this treatment to achieve a goal that’s important to me?’ and ‘How much can I get away with without it?’ Perceived necessity is not a form of efficacy belief: people might believe that a treatment will be effective but not that they need it. They might have a low necessity belief even if they understand the scientific evidence for the potential benefits of treatment. This might occur because people do not ‘value’ that particular benefit or perceive it be important enough to overcome concerns about taking the medicine. For example, a person with asthma may know that inhaled corticosteroids are effective, but may not believe that treatment is needed every day even when they feel well. In this case, they hold beliefs in efficacy but have low necessity beliefs (Horne, Chapman et al., 2013).

Treatment Concerns

The types of concerns that individuals report about prescription medicines generally fall into several main themes. One theme is the experience of symptoms as medication ‘side effects’ (Cooper et al., 2015). These side effects may be either currently experienced, or in the case of many individuals, not been experienced at all but create worry about their future existence. These future concerns can lead to the experience of side effects. For example, in a survey of 1,757 individuals with asthma, individuals who reported treatment side effects had stronger concerns about their treatment than those who did not report adverse effects (Cooper et al., 2015). Indeed, negative symptoms are often attributed as side effects of the medication, as there is often an expectation of side effects with treatment, leading to a search for confirmatory symptoms (Heller, Chapman, & Horne, 2015). Future concerns can also relate to the belief that regular medication use can lead to long-term dependence or accumulation in the body (Horne et al., 1999).
Another common theme is that regular use of medication now will make it less effective in the future (Horne, Parham, Driscoll, & Robinson, 2009). These core concerns seem to be consistent across conditions and cultures, and they are typically endorsed by over a third of participants (Chapman et al., 2015; Horne et al., 1999, 2009).

Concerns also relate to the meaning that being on regular medication has for the individual and their sense of self. Taking a daily treatment may be an unwelcome reminder of an illness that has a negative impact on how people see themselves or perceive they are seen by others. In these circumstances nonadherence might be seen as an implicit strategy for minimizing the impact on their sense of self (Cooper et al., 2002). Determining the necessity of a treatment may also be influenced by notions of self. There has been disappointingly little research in this area, but perceptions that one can resist the progress of disease by drawing on sources of inner strength, hardness or by keeping a positive outlook emerged as reasons for deciding not to start clinically indicated ART in interviews with over 100 HIV-positive men (Cooper et al., 2002).

These treatment concerns are evaluative summations of representations of the threat posed by medication. Similar to concept of illness representations in the CSM, treatment representations have both a cognitive and emotional dimension (Horne & Weinman, 1998; Leventhal et al., 1998). Representations of these risks (and benefits) of medication comprise beliefs about the timeline for onset and duration of effects, their likely consequences and the potential for control or cure (Leventhal et al., 1998).

**Balancing Necessity Against Concerns: The Necessity Concerns Differential**

Treatment Necessity beliefs and Concerns can be assessed using the validated Beliefs about Medicines Questionnaire (BMQ), which has two parts: the BMQ-Specific assessing beliefs about a particular prescribed treatment (Necessity beliefs and Concerns) and the BMQ-General assessing more general beliefs about pharmaceuticals as a class of treatment (Horne et al., 1999). In the meta-analysis referred to earlier, adherence to medication prescribed for long-term conditions was often related to necessity beliefs and concerns. These seem to influence adherence separately and in combination, although in some studies one or other of the constructs had a predominant influence on adherence (Horne, Chapman et al., 2013).

This research suggests that many patients have a necessity-concerns dilemma in treatment decisions. Medication can be perceived as a ‘double-edged sword’ in which the potential benefit is compromised by the tendency to harm. For some, the dilemma is made more acute by the belief that efficacy and toxicity appear to go hand-in-hand and more effective medicines implicitly have more severe side effects (Leventhal, Easterling, Coons, Luchterhand, & Love, 1986).

A simple approximation of the relative importance of necessity beliefs and concerns for the individual can be obtained by calculating a Necessity Concerns Differential (NCD) in which the BMQ Concerns scale is subtracted from the BMQ Necessity scale. Despite the methodological limitations of this approach—specifically that we cannot be sure that a given score on one scale is equivalent to the same score on the other—a recent meta-analysis showed that NCD scores were normally distributed and were more strongly correlated with reported adherence than necessity beliefs or concerns considered in isolation (Foot, La Caze, Gujral, & Cottrell, 2016; Horne et al., 1999).

These effects might operate through both explicit and implicit processes. In some situations, nonadherence could be the result of a deliberate strategy to minimize harm by taking less medication. Alternatively, it might simply reflect the fact that patients who do not perceive their medication to be important are more likely to forget to take it. The impact of perceptions of treatment on adherence will also be influenced by beliefs about adherence, such as the importance of strict adherence to achieve the desired outcome (Siegel, Schrimshaw, & Raveis, 2000).
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Illness Beliefs Influence Perceptions of Medication Necessity:
An Extended Common-Sense Model

Patients’ beliefs about the necessity to engage with a particular treatment are influenced by their perceptions of the illness. To be convinced of a personal need for ongoing medication, people must first perceive a good fit between the problem (the illness or condition) and the solution (the medicine). Here, symptom perceptions relative to expectations are key (Horne & Weinman, 2002). Until they experience a chronic condition, most people’s experience of illness is symptomatic and acute. However, for many long-term conditions the medical rationale for maintenance treatment is based on a prophylaxis model where the benefits of treatment are often silent and long-term. This may be in stark contrast to the intuitive model of ‘no symptoms; no problem’ (Halm, Mora, & Leventhal, 2006). Similarly, missing doses may not lead to an immediate deterioration in symptoms, reinforcing the erroneous perception that high adherence to the medication may not be necessary. Related to this is the fact that people often stop taking treatment when they judge that the condition has improved. These judgments are often based on potentially misleading symptom perceptions rather than on objective clinical indicators of disease severity (Cooper, Gellaitry, Hankins, Fisher, & Horne, 2009).

This can be illustrated by considering two patients with asthma. The first shares the ‘medical view’ of asthma as an ‘acute on chronic’ condition (i.e., a chronic disease that manifests as acute symptomatic flairs or asthma attacks) with potentially serious consequences. This patient understands that asthma remains a problem even when there are no overt symptoms of breathlessness. In this scenario, the rationale for the regular use of inhaled steroids to prevent asthma attacks makes common sense. This can be contrasted with a second patient whose model of asthma is closely linked to symptom experience. This patient does not think that their asthma has serious consequences because attacks happen infrequently. Although this person feels ill during the asthma attack, at other times she or he has no symptoms, and the idea of taking a daily treatment doesn’t make common sense. The notion of asthma as a chronic condition, needing continuous treatment, is at odds with the experience of it as an episodic problem. The first patient is more likely to agree with the necessity of regular prophylactic medication than the second patient, who perceives the asthma to be an acute problem (short timeline) with few personal consequences (Halm et al., 2006; Horne & Weinman, 2002). Abstract scientific evidence for the potential benefits of treatment derived from clinical trials may be less persuasive than concrete symptom experiences (Cooper et al., 2002).

A more detailed description of how treatment representations can be incorporated into an extended CSM can be found elsewhere (Horne, 2003). The available research evidence suggests the value of this approach for both theory (Hagger, Koch, Chatzisarantis, & Orbell, 2017) and practice (Holmes et al., 2014).

Using the Perceptions and Practicalities Approach to Design Interventions

Practical barriers to adherence, such as financial costs or forgetting treatment, are often the primary targets of adherence interventions. Common interventions to address these include the use of reminders and simplifying treatment regimens and make medication-taking as easy and convenient as possible (Ingersoll & Cohen, 2008; Vervloet et al., 2012). These approaches can improve adherence in the short-term if the key barriers to adherence are practical ones. Moreover, interventions should be tailored to the individual’s unique barriers and linked to their lifestyle and environment to encourage habit formation.

Nevertheless, interventions that are routine- or habit-driven can be susceptible to changes in the individual’s environment such as in weekends or vacations (Lally & Gardner, 2013). Interventions
that are effective need to consider the context in which the individual acts. These include considerations of the health system, as well as individual specific factors such as their age, and cultural/ethnicity factors.

**Lifespan Influences on Adherence**

Age is not a consistent predictor with inconsistent findings across studies (Dima, Hernandez, Cunillera, Ferrer, & de Bruin, 2014). However, aspects of the lifespan may create certain challenges for adherence, for example, a cognitive decline in older age combined with polypharmacy. In children, adherence appears to be better in younger children, linked to parental supervision, with a reduction in adherence occurring during adolescence (McQuaid, Kopel, Klein, & Fritz, 2003). Parental attitudes are key. In asthma, children of parents who exhibited positive attitudes of daily inhaled corticosteroids (ICS) use and believed that using ICS daily was an important part of treatment were significantly more likely to show better adherence than children of parents who did not (Van Dellen et al., 2008).

**Influences of Ethnicity and Culture on Adherence**

**Ethnicity**

Although ethnicity, like age, is not a consistent predictor of adherence, individuals of ethnic minority groups who are disadvantaged or marginalized consistently show poorer adherence and health outcomes than other groups (Sabaté, 2003). For example, people with asthma in the US who are of non-White ethnicity and live in inner cities show poorer adherence and outcomes than Whites (Apter et al., 2003; Gaffin et al., 2015; McQuaid et al., 2012). Similarly, indigenous populations such as the Maori population in New Zealand, or the Aboriginal and Torres Strait Islander peoples in Australia, have consistently poorer adherence and health outcomes (Kumble, 2013).

The reasons for this higher risk of nonadherence in minority ethnic groups are unclear. We should avoid making prejudicial assumptions about adherence based on ethnicity alone because individual differences are likely to be more predictive. Hence, approaches based on tailoring to individual needs (e.g. motivation and ability) are preferred. However, it is important to recognize that minority groups may face particular constraints that limit both motivation and ability (Gaffin et al., 2015; Kumble, 2013; Piette et al., 2006). For example, parents of children from ethnic minority groups more often report a lower perceived need for treatment (Conn, Halterman, Lynch, & Cabana, 2007). Moreover, ethnic minority populations often have a lower socioeconomic status, which affects their ability to access needed medication (Kardas, Lewek, & Matyjaszczyk, 2013; Kumble, 2013; Mathes, Jaschinski, & Pieper, 2014) and can affect health in other ways (see Chapter 21). Indeed, interventions that have been developed specifically for ethnic minority populations seem to improve self-management and outcomes (Flores et al., 2009; Joseph et al., 2007).

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Culture can also impact adherence (Napier et al., 2014). Culture refers to people’s belief or value systems that shape people’s ideas around health and therefore influence adherence. These ideas, influenced by cultural traditions, norms and language, might reflect differences about what caused the illness, whether it can be cured and how it should be treated. For example, in a UK study examining medicine beliefs, students who reported an Asian cultural background expressed more negative views about medication—such as perceiving medicines to being intrinsically harmful and addictive—compared to those who reported a European cultural background (Horne et al., 2004). The impact
of cultural differences should be considered when adherence interventions developed in one cultural context are applied in another. Although the principles of the intervention are likely to remain applicable (e.g. tailoring support to address salient perceptions and practicalities), elements of the intervention may need to be adjusted in a process cultural adaption.

**Designing Interventions for Use in Practice**

For interventions to be used in practice, they need to be simple, clear and require minimal effort to implement (Flottorp et al., 2013). The PAPA framework provides an approach to do this, including aspects of the CSM that incorporate treatment beliefs and illness representations. The intervention approach consists of three principles:

1. **Communicate a common sense rationale for the adherence.** This principle is about necessity beliefs: Why should the individual adhere to the medication in terms of their personal necessity for the treatment? How does it relate to the individual’s goals or interests that are important to them? The reasons should demonstrate a common sense fit with the patient’s beliefs about the illness and consider symptom expectations and experiences.

2. **Address any concerns.** This relates to the concerns aspect of the necessity-concerns framework. Any concerns should be elicited and addressed, and support provided to help manage these.

3. **Make adherence easy.** This relates to addressing practicalities—how can we make the treatment as easy and convenient as possible to help the individual take the treatment and form a treatment habit?

4. **Tailor interventions to individual needs and preferences.** Many studies have shown that tailored interventions are more likely to be effective (Gatwood et al., 2016; Hugtenburg, Timmers, Elders, Vervloet, & van Dijk, 2013; Kassavou & Sutton, 2017; Lewis et al., 2013). Tailoring can be achieved by identifying and addressing the individual’s specific barriers to adherence. Questionnaires such as the Beliefs about Medicines Questionnaire (Horne et al., 1999) or the brief Illness Perceptions questionnaire (Broadbent, Petrie, Main, & Weinman, 2006) can be used to help identify and elicit these barriers. To elicit perceptual barriers use questionnaires around practical barriers to adherence (Chapman et al., 2015; Clifford, Barber, Elliott, Hartley, & Horne, 2006; Nguyen, Caze, & Cottrell, 2014).

Besides the intervention content, it is important to also consider the channel through which the information is delivered to the individual. This also should be tailored to the individual. For example, young people may be more responsive to apps or mobile-based interventions (Petrie et al., 2012). The wider context where the intervention will be implemented (such as the healthcare system) should also be optimized to ensure effective delivery of the intervention (Tucker et al., 2017).

**Conclusion**

Despite decades of research on adherence, medication nonadherence continues to be a challenge to global health, contributing to increased morbidity, mortality and healthcare costs. Interventions have had limited success, with the most effective interventions typically being too complex to implement in practice in a sustainable way. There is a need for a more simple and pragmatic intervention approach.

The Perceptions and Practicalities Approach outlined in this chapter provides a simple framework that sums up the two key ingredients required for effective adherence support—motivation and ability. These can be operationalized by considering the necessity beliefs and concerns of an individual,
which affect motivation, and the unique practical barriers facing an individual, which influences ability. This forms the basis of the Necessity-Concerns Framework which extends the Common Sense Self-Regulatory Model of behavior to specifically address medication representations as a context for understanding medication adherence.

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