Review

The Psychology of Patient Compliance: A Focused Review of the Literature

Tracie M. Umaki,* Michael R. Umaki,† and Charles M. Cobb‡

Background: Excellent patient compliance to periodontal maintenance is absolutely necessary for successful long-term therapy. However, absolute (100%) compliance is rare, having been reported as low as 16%. Although social, behavioral, cultural, and economic factors have been implicated as determinants in patterns of compliance, the influence of personality characteristics on attitudes remains to be carefully explored. This focused review of the literature explores current research addressing psychologic factors associated with compliance to periodontal maintenance therapy.

Methods: A literature search of PubMed electronic database was conducted, inclusive of the years 1990 to 2011. The search used MeSH terminology such as periodontal maintenance, emotional intelligence, personality, patient compliance, etc. In addition, searches were conducted of reference lists from original research and review articles. Studies were assessed with respect to methodology and design, statistical analysis, and psychologic measurements.

Results: Non-compliant patients appear to have a higher frequency of stressful life events. Studies suggest that initial patient response to periodontal therapy may be related to emotional intelligence. Regarding personality factors, high neuroticism and low conscientiousness are most widely associated with non-compliance. As such, increased knowledge of the “Big Five” personality factors (i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) could assist clinicians in potentially increasing compliance among patients. Clinicians could also incorporate a working knowledge of the Health Belief Model and Theory of Planned Behavior to develop individualized treatment strategies for patient compliance.

Conclusion: Non-compliance to periodontal maintenance cannot be solely explained by one determinant but rather may involve an individual’s health beliefs, emotional intelligence, psychologic stressors, and personality traits. J Periodontol 2012;83:395-400.

KEY WORDS
Behavior; dental prophylaxis; emotional intelligence; patient compliance; periodontal diseases; personality.

It is well known that successful long-term periodontal therapy requires exceptional patient compliance to a periodontal maintenance program.1-3 Although maintenance is necessary to retain benefits of treatment and to prevent relapse, 100% patient compliance (i.e., attendance at all maintenance appointments) has been reported to be as low as 16%, with nearly 34% of patients failing to return for maintenance after completion of active therapy.4 Despite substantial efforts to improve compliance, Wilson et al.5 reported that patient compliance improved to only 32%. Factors, such as time constraints, prolonged treatment plans, and perceived unimportance of periodontal maintenance therapy (PMT), have been noted as factors contributing to poor patient compliance.6-9 Although social, behavioral, cultural, and economic factors have also been implicated in determining patterns of compliance, the influence of personality characteristics on attitudes driving these behavioral responses remains to be carefully explored.6 Although personality traits are generally stable, factors affecting how these traits impact behavioral responses can vary. Increased knowledge of the “Big Five” personality factors (i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness)10 could assist clinicians in increasing compliance among patients by providing...
a deeper understanding of individual factors that may influence a patient’s likelihood to comply to treatment. This Five-Factor Model (FFM) is often used in health-related research to highlight human nature from the perspective of enduring individual differences by providing a comprehensive classification of personality traits in five broad dimensions of personality. This focused review of the literature explores current research addressing psychologic factors associated with PMT and discusses potential interventions and conceptualizations from a psychologic perspective.

**MATERIALS AND METHODS**

A literature search of the PubMed electronic database was conducted, inclusive of the years 1990 to 2011. The search used the following MeSH terms: 1) periodontal diseases; 2) periodontal maintenance; 3) emotional intelligence (EI); 4) personality; 5) behavior characteristics; and 6) patient compliance. In addition, searches were conducted of reference lists from original research and review articles. A total of 14 studies directly addressing compliance issues in periodontal therapy and/or maintenance were used in this study. In addition, 10 studies from psychology literature that investigated issues of patient compliance were integrated into the review. Studies were assessed with respect to methodology and design, statistical analyses, and psychologic measurements.

**RESULTS**

**Stress and Compliance**

An innovative study by Becker et al. sought to determine whether differences in personality and responses to stressful life events existed between patients who were compliant in PMT compared to those who were not compliant. Personality differences between groups, as measured by the Adjective Check List (ACL), were not statistically significant; however, results revealed differences in the personalities of compliers versus non-compliers, with the non-compliant group reporting a higher frequency of stressful life events and the compliers demonstrating a more positive self-image. The non-compliant group also showed less stability in personal relationships, defensiveness toward periodontal therapy, and a “child-like” orientation as revealed by the ACL. This type of immature orientation may warrant a more authoritative consultation at the outset of treatment.

Borkowska et al. reported a series of negative associations between plaque scores and patients’ willingness to adhere to a program of prevention and/or treatment. Inflammatory variables were associated with aspects of patient behavior emphasizing passivity, dependence, and depressed mood. As seen in other studies, a pessimistic “explanatory style” was characteristic of depression and susceptibility to a range of physical illness.

Genco et al. found stress associated with financial strain and depression to be significant risk factors for more severe periodontal disease. However, problem-focused coping (e.g., creating a plan of action, “good coping”) served as a moderator variable for individuals under financial strain and resulted in little or no effect on periodontal status. Folkman and Lazarus used the Ways of Coping Checklist to create a model that categorizes coping strategies as problem focused or emotion focused. Problem-focused coping aims to actively alter a stressful situation and is most effective when perceived control of the stressor is also high. Emotion-focused coping regulates the individual’s emotional response to the stressor. Although some emotion-focused strategies can be beneficial (e.g., using social support), the more typical “avoidance behaviors” (e.g., denial, pessimism, drug or alcohol consumption) have been related to increased distress and disability. This underscores the premise that individuals prone to emotion-focused coping (“poor coping”) are often at greater risk for periodontal disease.

**Emotional Intelligence**

EI refers to the ability to perceive, control, and evaluate emotions. Mayer and Salovey regard EI as a subset of social, practical, and personal intelligence, which assists thought by generating and regulating emotions to promote emotional and intellectual growth. The Mayer-Salovey-Caruso Emotional Intelligence Test is often used to measure EI ability, and evidence indicates that EI can predict a variety of important outcomes. For example, as EI rises, so does academic performance, measures of relatedness, and ability to communicate motivating messages. An individual high in EI is better able to perceive, manage, and understand emotions; they may be higher in verbal and other types of intelligence, less likely to engage in problematic behaviors, and have more prosocial interactions. As seen by Gamboa et al., associations between EI and short-term changes in plaque and bleeding suggest that initial responses to standardized periodontal treatment may be related to EI. Results of this pilot study may aid the development of interventions aimed at improving patients’ EI. This, in turn, may improve response to initial periodontal therapy, and possibly, PMT.

Saklofske et al. examined relationships among personality, coping style, EI, health locus of control, and health behaviors. This study confirmed previous findings that EI was positively associated with problem-focused coping and internal locus of control (outcomes are determined by one’s actions) and negatively associated with emotion-focused coping. EI, coping and health locus of control were intercorrelated, which created a superordinate coping/EI factor. This information suggests the need for additional investigation of
ways in which EI can serve as a coping response. By improving one’s EI, coping resources are expanded and may enable reprioritization of health needs and improve compliance.

Dumitrescu reviewed current literature regarding psychologic perspectives on pathogenesis of periodontal disease. Most published studies in this review support a positive association between periodontitis and several psychosocial factors, mainly socioeconomic status, personality factors, anxiety, depression, lack of social support, and life stress. Although this comprehensive review provides information regarding the pathogenesis of periodontal disease and associated factors, additional research is necessary to isolate personality factors often associated with the behavioral mechanism of non-compliance to PMT appointments.

**Personality Factors**
The nature of personality traits can be seen as individual tendencies to show consistent patterns of thoughts, feelings, and actions. Basic tendencies are highly predictive over time, exert influence on actions, and can be used to predict future behavior. As such, increased knowledge of the Big Five personality factors could assist clinicians in increasing compliance among patients. This FFM is often used in health-related research to highlight human nature from the perspective of enduring individual differences by providing a comprehensive classification of personality traits in five broad dimensions of personality.

Of the five personality factors, neuroticism and conscientiousness are most widely associated with non-compliance. A highly neurotic individual is prone to experience a wide range of negative emotions. Neuroticism is often expressed through anxiety, anger, hostility, impulsiveness, or depression and is frequently related to somatic distress. Depression, in particular, has been identified as a risk factor for medical non-compliance. Neurotic individuals may also misinterpret internal states, creating a proneness to interpret physiologic sensations as illness. External stressors are often overwhelming, and coping strategies are typically emotion focused or immature, which increase risk for non-compliance. This is exemplified by Costa et al. whereby higher scores of neuroticism and openness and low scores of conscientiousness were associated with high scores on the Oral Impacts on Daily Performance questionnaire/interview. Overall, neuroticism was negatively related to compliance, and periodontal status was significantly better among regular compliers than erratic compliers. Kressin et al. also found negative associations between neuroticism/anxiety and toothbrushing with extraversion positively associated with oral self-care behaviors. In a recent meta-analysis, conscientiousness negatively predicted a wide array of health-related behaviors (e.g., excessive alcohol use, unhealthy eating) but positively predicted wellness behaviors and adherence to medications. In addition to high neuroticism, patients low in conscientiousness are also at risk for non-compliance.

Understanding personality would appear advantageous for the clinician; however, assessing personality characteristics in the dental practice setting can be complex. Methods of predicting health behaviors while exploring personality factors influencing such behavioral responses may offer the most promise in predicting and potentially circumventing non-compliance to periodontal maintenance.

**DISCUSSION**

**Models for Prediction of Health Behaviors**
The Health Belief Model (HBM), Theory of Planned Behavior (TPB), and Social Learning Theory often are used to help understand and improve patient compliance. The HBM is a value-expectancy theory focusing on two aspects of health behavior: threat perception and behavioral evaluation. It posits that people will take action to prevent, to screen, or to control ill-health conditions based on the following components: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The model also proposes that cues to action can activate health behavior and are influenced by self-efficacy beliefs. Janz and Becker used a vote-count procedure showing the percentage of times the four main HBM constructs were statistically significant predictors across 46 studies. Barriers were significant in 89% of studies, susceptibility in 81%, benefits in 78%, and severity in 65%. Although limitations associated with vote-count procedures suggest using caution when interpreting findings, this quantitative review suggests the HBM constructs are often found to be significant predictors of health-related behaviors.

The TPB, an extension of the Theory of Reasoned Action, is a social cognitive model used to study cognitive determinants of behavior and explains which attitudes are likely to predict behavior. Intentions are caused by collaborative influences of attitudes toward the behavior and subjective norms. These intentions causally determine behavior. In the study by McCaul et al., “perceived control” proved to be a powerful predictor of intentions across four health-protective behaviors: toothbrushing and flossing, and breast and testicular self-exams. When individual perceptions of control match approximate reality, perceived control can more directly affect behavior. Additionally, performance of self-protective behaviors could be increased if individuals believe they are capable of performing the behavior consistently. Clinicians could use this information by developing realistic, individualized treatment strategies for
patients aimed at increasing both perceived control and self-efficacy (e.g., tapering recall visits after improvement to motivate behavior and encourage adherence to treatment regimen). Models such as the Transtheoretical Model (TTM) of change, which purports that people will decide to make change based on their readiness, and motivational interviewing (exploring and resolving ambivalence about behavior change) can also be used to assess readiness for and to facilitate change.46

**Applications**

Non-compliance to periodontal treatment cannot solely be explained by one determinant. Assessments designed to collectively evaluate an individual’s current health beliefs, EI, current psychosocial stressors, and personality traits would provide the most useful information. Although the predictive validity of the HBM is not without criticism, HBM constructs are correlated with a range of health-related behaviors. Targeting these health beliefs may prompt behavior change and may be a viable option for prediction of compliance in a periodontal treatment setting. By identifying potential barriers to treatment, the clinician may develop an alternative treatment option to counteract perceived limitations (e.g., removing barriers for patients with lower self-efficacy by offering floss or a variety of interproximal cleaning aids) and potentially provide a defense against non-compliance. These periodontal aides could also serve as daily reminders of the patient’s ongoing periodontal care and encourage commitment to PMT appointments.

The TTM of change, coupled with strategies aimed at altering cognitions and facilitating behavior change (e.g., motivational interviewing), could be used to assess a patient’s readiness for change and provide a guide for increasing compliance. A psychologist trained in these principles can provide a heightened awareness of patients’ limitations or barriers to appropriate care and assist with accurate interpretation of assessment results. This type of service can provide access to behavioral health care, collaboration between dental clinicians and behavioral health providers, and improve overall health and wellness.

Also important to consider is Horne’s47 description of non-compliance being intentional, involving a patient’s choice to disregard treatment recommendations, or unintentional, potentially resulting from cognitive deficiencies (e.g., poor memory, attention, or comprehension). Although unintentional non-compliance may be linked to insufficient resources, intentional non-compliance may be related to motivation.47 Although patient education, maintenance appointment reminders, and advice may counteract the unintentional non-compliance, intentional non-compliance continues to threaten treatment success. Interventions designed to address both unintentional and intentional non-compliance may offer more favorable outcomes in the field of periodontology.

Although it is unrealistic to assume that a comprehensive evaluation could be conducted in a periodontal setting, personality assessment may offer the most valuable information in a relatively short amount of time. Because personality exerts influence on behaviors and EI is an aspect of personality, measures such as the Neuroticism Extraversion Openness Five-Factor Inventory (NEO FFI-R)48 may offer a comprehensive sketch of the patient’s emotional, interpersonal, attitudinal, and motivational styles, when applied and interpreted by a qualified professional. The NEO FFI-R assesses general personality traits and is useful in a wide variety of contexts. Assessment results could aid in selecting the approach to use during initial consultation (e.g., authoritative versus collaborative) and could also be used to recommend against a certain treatment for individuals with a history of non-compliance or who possess factors that typically threaten treatment success. Collectively, such information may allow comparison of behavioral patterns across patients to detect potential associations or parallels between degree of disease severity and level of non-compliance.

Regarding PMT, insight into personality factors could guide the periodontist’s approach to care and influence the dissemination of information. For example, if a person is identified as neurotic, explanations of treatment may need to be more detailed and should include a written description of specific side effects and methods for minimizing discomfort. This will provide a future reference for the patient and potentially reduce anxiety associated with unexpected pain. Additionally, because neuroticism is often expressed through anxiety, anger, impulsiveness, depression, and somatic distress, it would be beneficial for the periodontist to inquire about a patient’s psychosocial history to identify the type of problematic behaviors/emotions the patient often experiences. With a highly anxious patient, it is important to ensure that the patient has a thorough understanding of both the necessity of treatment and likelihood of improvement if PMT appointments are kept. If a patient has a history of depression, motivational strategies (e.g., reminder calls, e-mails, letters) may increase motivation, whereas positive reinforcement (e.g., offering praise for attending appointment, flossing, and use of periodontal aids) may encourage continued compliance. Sharing case study examples and radiographic images of improvement could also provide concrete evidence of potential improvement and instill hope within the patient. This strategy would also benefit a patient who is low in conscientiousness.

Finally, a patient who is high in neuroticism or low in conscientiousness may have difficulty making PMT a priority in their lives. As with clinicians in any medical
field, the challenge becomes finding a way to communicate the importance of treatment in a language the distressed patient can understand. Discussing the advantages of PMT (e.g., esthetic advantages, avoidance of future bone loss, improvement of quality of life, retention of benefits gained from initial treatment) and addressing present concerns with a future plan will aid in increasing the priority of PMT.

CONCLUSIONS
This focused review of the literature explores current research addressing psychologic factors associated with compliance to PMT. Non-compliance has been linked to negative aggression and immaturity,11 passivity, dependence and depression,13 emotion-focused coping, external locus of control and poor coping abilities,16,49 low EI,25,26 neuroticism,6,33 and perceived control.44 Clearly, compliance to periodontal treatment is threatened by many psychologic variables.9,50-51 Understanding the impact of personality traits on compliance, coupled with a thorough understanding of the patient’s clinical history and health beliefs, could aid the development of appropriate PMT programs while providing a viable framework for assessing compliance probabilities and threats of treatment failure.

Because the field of periodontics currently experiences a 32% rate of absolute compliance, at best,5 methods that anticipate health behaviors while understanding the personality factors that impact such behavioral responses may offer promise in predicting and potentially avoiding non-compliance to PMT.

ACKNOWLEDGMENT
The authors report no conflicts of interest related to this review.

REFERENCES
The authors report no conflicts of interest related to this review.


