Chapter 4
Evaluating the Biopsychosocial Milieu of Chronic Pain

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4.1 Introduction

The biopsychosocial model was developed in the 1970s and is now considered part of the standard of care in psychiatric and chronic pain assessments. The model incorporates three elements—biological, social, and psychological—and enforces the idea that medical illness is shaped by the combination of each of these three domains. In this chapter, we will discuss the history of the biopsychosocial model in evaluations, evidence for its usage, and tips for performing this assessment.

4.2 Background

George Engel, a psychiatrist, proposed the biopsychosocial model in 1977. He saw the model as a solution to the crisis in the field of psychiatry regarding its relationship with the rest of the medical field. Engel claimed psychiatry was divided between two groups—advocates of separating psychiatry from the medical field and its focus on treatment of "diseases" and advocates of having psychiatry focus on "biological" psychiatric "diseases." Engel believed the purely biomedical model hindered diagnosis. Patients can report symptoms in different ways depending on social and psychological factors, and we do not always have clear laboratory or other biological markers indicating the presence of disease. He advocated a biopsychosocial model that he claimed was more in keeping with the historical practice of medicine, arguing that this model would lead to improved diagnosis and treatment [1].

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In promoting the benefit of a biopsychosocial model beyond psychiatry, Engel published an article describing the biopsychosocial assessment in a patient with chest pain. He constructed diagrams showing the interactions between an individual, their perceptions and history, and the molecular mechanisms of disease. He stated that the ultimate benefit of his model was to see a patient as a human [2]. Engel's ideas were rapidly adopted. By the late 1990s, nearly half of all medical schools incorporated the biopsychosocial model into their curriculum with up to 10 % of their curriculum being devoted to biopsychosocial issues [3]. Today, the American Psychiatric Association recommends that all psychiatry assessments include a biopsychosocial formulation [4].

Beyond psychiatry, Engel's ideas were incorporated into notions of patient-centered care [5] and have become especially prominent in medical specialties dealing with chronic pain and substance usage. Most treatment guidelines recommend that a biopsychosocial assessment be performed for these population groups [6–8]. According to the Institute of Medicine's 2011 report on pain management, "interdisciplinary, biopsychosocial approaches are the most promising for treating patients with chronic pain" [9].

4.3 Potential Concerns

Although the biopsychosocial model is now an institutional framework of psychiatry and general medicine, both philosophical and technical problems have appeared. Engel was accused of creating a "strawman" out of biomedical medicine and of forcing doctors to be "too good" by assessing and understanding patients in ways that were essentially too complex and time-consuming [10]. Even in psychiatry where trainees are taught to think in a biopsychosocial framework from internship onward, residents show poor ability to do a biopsychosocial assessment [11]. Determining the depth to be explored for each component is challenging as a full assessment in all three domains of the biopsychosocial model can be exhaustive, especially when coupled with limited clinical resources and time.

4.4 Examination of the Evidence

The broad scope of the biopsychosocial model results in challenges in researching its efficacy. Evidence for it in the chronic pain setting varies based on different pain modalities and on different patient populations. The Cochrane Review looked at studies on multidisciplinary biopsychosocial programs for chronic neck and shoulder pain and found only two low-quality studies that met their inclusion criteria [12]. For subacute back pain, they again found only two limited quality studies that met inclusion criteria, but determined there was moderate evidence for positive efficacy of a multidisciplinary biopsychosocial assessment, especially if it included a workplace evaluation [12, 13]. Forty-one qualifying randomized controlled trials

were included in their review of chronic low back pain. The evidence did support a reduction in both pain intensity and disability in patients who received multidisciplinary biopsychosocial rehabilitation, although the effects were modest. More intensive interventions did not appear to result in significantly better improvement than less intensive interventions [14]. For repetitive strain injuries, they found only two low-quality studies, noting a need for higher-quality studies [15]. Of note, all of their studies focused solely on working age adults. There is a paucity of data for pediatric patients [16].

Although studies showing the efficacy of a comprehensive multidisciplinary biopsychosocial assessment are limited, there is strong evidence of a relationship between psychosocial factors and chronic pain. Many mechanisms are proposed and some are validated. For example, fear inhibits pain in the short run, but chronic fear leads to anticipatory anxiety, which worsens chronic pain. People who anticipate pain experience increased pain, and activation of the dopamine system, which increases positive emotions, reduces the subjective experience of pain ([17], p. 6).

Population studies show that people who suffer from chronic pain report higher rates of childhood adversity (divorce, sexual abuse, family conflict, etc.). Childhood abuse and neglect predict pain when compared with healthy controls. Alexithymia, the inability to describe one's feelings, is found in higher rates in people with chronic pain conditions, including low back pain and temporomandibular joint pain. Alexithymia has a positive correlation with pain severity ([17], p. 6). Pain catastrophizing, ruminating and feeling hopeless about pain, is associated with greater reported pain. Patients who catastrophize about pain are more likely to have a history of trauma ([17], p. 13). Patients with increased pain-related anxiety are more likely to avoid rehabilitation tasks, hindering recovery from injuries and procedures ([17], p. 13). There is growing evidence that people with a history of insecure parental attachment have increased pain. This association is theorized to have a role in the colloquial usage of pain language to describe interpersonal losses (e.g. "brokenhearted") ([17], p. 6).

Patients with chronic pain have a higher incidence of mental illness. Depression rates in chronic pain patients are as high as 85 % in dental clinics addressing chronic pain and 52 % in general chronic pain clinics, compared with depression rates of 5–10 % in the general population [18]. Anxiety disorders may be twice as common in chronic pain patients as in the general population, and Panic Disorder and Post Traumatic Stress Disorder occur three times as frequently in this population [19]. Addiction and substance use disorders are frequently comorbid in chronic pain. Treatment with opioids increases the risk of addiction. Estimates of rates of addiction among chronic pain patients range from 3 to 40 % [20].

Psychosocial treatments for pain can result in improved outcomes. Various psychological interventions have been studied, ranging from insight-oriented to psychodynamic to cognitive–behavioral therapies. Cognitive behavioral treatments and self-regulatory treatments have the strongest evidence base for efficacy [21] and can result in reduced pain and disability and improved overall functioning [22]. Other treatment modalities for chronic pain with less accumulated evidence than CBT include meditation, motivational interviewing, guided imagery, and hypnosis [22]. A biopsychosocial assessment may be helpful in determining which patients would benefit from therapy.

Table 4.1 Major treatment guideline recommendations

Institute of Medicine [9]	Assessment of emotional aspects of pain is essential; failure to adopt biopsychosocial model can result in increased disability
Institute for Clinical Systems Improvement [6]	Assess for biopsychosocial factors including psychiatric illness and trauma history
American Society for Anesthesiologists [23]	Assess for psychosocial factors that can contribute to pain
Institute of Health Economics (Canada) (IHE 2011) [46]	Assess for psychosocial factors with back pain; increase intensity of assessment if patients fail to improve with early interventions
Scottish Intercollegiate Guidelines Network (SIGN 2013) [37]	Use biopsychosocial frame to assess functional impact of pain, potentially spreading evaluation over several visits. Intensity of evaluation depends on severity of pain and responsiveness to early interventions. Refer to multidisciplinary pain clinic if patient fails to improve or if patient has significant social or occupational impairment from pain
National Institute for Health and Care Excellence (United Kingdom) [24]	No significant recommendation for biopsychosocial assessment for back pain; recommend treating identified causes of psychological distress before surgical referral
European Guidelines for Evidence-Based Management [25]	Strong evidence that low workplace support leads to chronicity in low back pain; moderate evidence that psychosocial distress leads to low back pain chronicity. Recommends an evaluation of work issues, psychological distress, and patient expectations

4.5 Current Recommendations for Chronic Pain Assessments

In spite of limitations in studies for chronic pain, a biopsychosocial assessment is recommended by most treatment guidelines. See the table below for a summary of current recommendations both from North America and Europe. In general, guidelines recommend assessing for psychosocial factors and considering a multidisciplinary biopsychosocial assessment if patients fail to improve with routine treatment (Table 4.1).

4.6 Performing the Assessment: The Biological Assessment

General elements of this part of the assessment include obtaining a thorough history of the pain, including its location, character, duration, intensity, exacerbating, and relieving factors. A physical examination should focus on looking for obvious deformities, atrophy, asymmetry, cyanosis, effusion, or pallor. A focused neurological exam including assessment of language and cognitive functioning, gait, strength, sensation, and reflexes should be included. Allodynia and hyperalgesia should be assessed as these are particularly prominent in chronic pain syndromes [6]. Interestingly, there is limited data to support the utility of most physical tests

routinely done in a low back pain examination, both those assessing lumbar herniation [26] and chronic low back pain [25].

Diagnostic testing is complicated in a chronic pain assessment. Individuals with identical imaging findings can have different subjective experiences of pain because of the complex and multifactorial nature of pain [27]. MRIs are the most frequent imaging test ordered in chronic pain assessments, but plain X-rays, electromyography, and nerve conduction studies may be used as well [6]. European guidelines recommend against electromyography in chronic low back pain assessments and against imaging in general unless there is strong clinical suspicion of need for imaging [25]. Imaging and diagnostic testing recommendations change over time and providers should remain updated on the latest recommendations and evidence regarding these tests to minimize the risk of excessive testing and iatrogenic harm.

Other elements of a biological assessment include determining the biological mechanism of the pain, dividing it into four types—neuropathic, inflammatory, muscle, and mechanical/inflammatory—with the understanding that there might be multiple types of pain in one presentation. This is important because the mechanism of pain can suggest the most appropriate pharmacologic treatment. This information should be obtained from the history, physical examination, and possibly diagnostic imaging [6].

4.7 The Social Assessment

Basic elements of a social history include developmental history, marital and relationship status, occupational history, legal history, and access to treatment, which includes financial, insurance, and regional factors. Obtaining history about a person's work and home setting is a critical part of this assessment, and one should always be aware of the possibility for secondary gain [28]. Motivation to return to work or to obtain disability might affect a patient's presentation and engagement in treatment, and job dissatisfaction is a predictor of poor outcomes [29]. To understand the impact of the pain, determine premorbid and post-morbid social functioning as chronic pain can negatively impact social functioning by leading to work and income loss, family stress, and social isolation [30].

The social assessment should be organized in a chronological manner, starting with childhood and moving through different stages of adulthood. Particular developmental concerns can affect chronic pain, including early attachment to caregivers and abuse and neglect during childhood [31]. Attachment patterns can be ascertained by asking about early childhood figures and for a description of a person's childhood. Descriptions that are overly vague or idealized can be an indicator of an insecure attachment pattern [32]. Assessing the quality and duration of childhood and adult relationships also provides insight into social functioning and can give an idea of how well a person will engage in treatment. A person with a pattern of struggles with dependency may seek to find their own treatment rather than following medical advice, whereas a person with a history of dependent relationship needs might have an incentive to be perceived as sick or disabled [33].

An occupational history is particularly useful for a chronic pain assessment. Questions include how invested has the person been in work, what are the physical requirements of the job, and are work modifications possible. Once a person is out of work for an extended period for a disability, their odds of successfully returning to work falls precipitously [34]. Cultural factors are also important although it is difficult to make generalizations about culturally based responses [35]. There is limited indication that people of different cultures experience pain differently, although culture can influence expressions of pain [36].

4.8 The Psychological Assessment

The psychological assessment is often combined with the social assessment, and even in this chapter, we periodically refer to the psychosocial assessment, but a psychological assessment focuses on one's thoughts and feelings. It includes an assessment of one's psychiatric history including substance use disorders, and of a patient's coping skills and psychological defenses. This assessment can be conducted in many ways, but screening tools are often particularly helpful [29], as are serial assessments over time [37].

Screening intensity should vary based on the chronicity and severity of pain with an indication for increased screening when patients fail to respond to standard interventions [6, 25, 37]. Even non-specialty providers should assess for depression and substance use disorders [6, 25, 37]. There are multiple brief screening tools of proven validity, including the CAGE and AUDIT for substance use disorders and PHQ-9 for depression [38]. Simply asking a patient if they have experienced depression, hopelessness, or anhedonia in the past month has high sensitivity for depression [39].

If more screening is indicated, longer psychological screening tools include the Battery for Health Improvement (BHI 2), Brief Battery for Health Improvement (BBHI 2), and the Pain Patient Profile (P3) [29]. These tests are all under copyright and require licensing fees. The P3 screen may be able to detect malingering [40] and has been found to have high construct validity for depression, anxiety, and somatization in pain patients [41]. The BHI 2 was designed specifically with a biopsychosocial assessment in mind with a goal to produce a graphical model of a biopsychosocial formulation. It has been accepted in evidence by different court systems and has been described as one of the "best" tools available for a pain assessment [42]. The BBHI 2 is a shorter version of the BHI and can be administered quickly in the office. It has validity measures for exaggerating and concealing information and can be used serially to assess for improvement over time [43].

Other psychological screening tools include the Million Behavioral Medicine Diagnostic (MBMD), which is designed for general medical patients and general psychological tests such as the Minnesota Multiphasic Personality Inventory (MMPI) and the Personality Assessment Inventory (PAI) [29]. The MBMD can be useful for assessing psychological issues in patients who do not have clear

Table 4.2 Psychological tests

psychological tests	Advantages	Disadvantages
Battery for Health Improvement (BHI 2)	Produces graph of biopsychosocial formulation; accepted as evidence in court hearings	Must pay fee to administer
Brief Battery for Health Improvement (BBHI 2)	Short, can be administered in office; can be used serially; validated for finding exaggerated responses and concealing information	Must pay fee to administer
Pain Patient Profile (P 3)	Can detect malingering; construct validity for depression, anxiety, and somatization	Must pay fee to administer
Million Behavioral Medicine Diagnostic (MBMD)	Designed for general medicine patients; might be useful for patients without clear psychopathology	Questionable reliability; not specifically designed for chronic pain; lengthy; must pay fee to administer
Minnesota Multiphasic Personality Inventory (MMPI)	General psychological screening; extensive	Needs to be combined with other testing for chronic pain; must pay fee to administer; time-consuming
Personality Assessment Inventory (PAI)	Useful for detecting psychopathology in chronic pain patients	Must pay fee to administer

psychopathology [43]. The MMPI is lengthy and would need to be combined with other instruments in performing a chronic pain assessment [43]. The PAI has been found to be useful for detecting psychopathology in chronic pain patients [44]. While all these tests have potential benefits, we do not have evidence to support the use of one screening tool over another or to suggest that one screening tool would work better than another in a specific population (Table 4.2).

4.9 Special Considerations for the Substance Using Patient

Substance abuse presents unique challenges in patient evaluations. Providers should be aware of red flags, including lost prescriptions, requests for early refills, belligerent, demanding or erratic behavior, and positive urine drug screens. Most treatment guidelines recommend a thorough assessment for substance using patients, including referral to multidisciplinary treatment centers. Unique biopsychosocial factors in substance using patients include the effects of tolerance and withdrawal, potential for overdose, legal consequences, diversion risk, and psychologically reinforcing effects of substances.

Providers should obtain collateral information from family members and previous providers and check any available prescription drug-monitoring databases. A thorough substance use history should be obtained, including tobacco and caffeine

usage, as well as an assessment of consequences of usage. In performing an assessment, providers should be particularly aware of patients who focus exclusively on opioids as treatment for their condition. In the physical exam, look for signs of substance use (track marks, skin infections, nasal or oral pathology) and assess patients for signs of intoxication or cognitive impairment. Quick screening tools are available, including the CAGE adapted for drug usage, AUDIT-C and Michigan Alcoholism Screening Test (MAST), but no screening tool replaces a thorough clinical interview. The Substance Abuse and Mental Health Services Administration (SAMHSA) recommends that pain providers have a strong referral network for substance use providers [45].

SAMHSA recommends drug screening for chronic pain patients on opioid treatment with frequency determined based on clinical assessment. What tests to include in the urine drug screens and whether to do less-sensitive point of care testing depend on the situation and clinical assessment. Point of care testing is limited by the potential for false positives and poor ability to detect synthetic and semisynthetic opioids, but is convenient and allows quick, affordable screening. Providers should be aware of the strengths and limitations of testing and should have a close relationship with the testing laboratory. One caveat of random drug testing is that physicians should be aware of the risk of disproportionately testing minority or marginalized populations [45].

4.10 Summary

The biopsychosocial model started in psychiatry and spread to other medical disciplines, picking up special resonance in chronic pain evaluations. Performing a biopsychosocial assessment in chronic pain patients is a standard of care in most treatment guidelines, although recommendations for how thorough this assessment should be are less clear. Generally, more thorough assessments in multidisciplinary settings are indicated for patients who fail to respond to usual treatment, who show signs of poorly controlled psychiatric conditions, and who have substance use disorders, especially unacknowledged ones. However, randomized controlled trials testing the efficacy of a biopsychosocial assessment are lacking, while the evidence for the connection between chronic pain and psychosocial impairment is much stronger.

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